CAPITAL GAINS TAXES IN THE SHORT RUN

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PREFACE

This study was prepared at the request of the Chairman of the House Budget Committee. It compares how different options for cutting capital gains taxes could affect the incentive to sell assets, economic efficiency, and federal tax receipts in the short run. The study was prepared by Leonard Burman under the direction of Joseph Cordes and Rosemary Marcuss. Valuable comments were made by Jerry Auten, Al Davis, Jane Gravelle, Maureen Griffin, Jon Hakken, Rick Kasten, Don Kiefer, Larry Ozanne, Linda Radey, Frank Russek, and Frank Sammartino. In accordance with CBO's mandate to provide objective and impartial analysis, the report contains no recommendations.

Paul L. Houts edited the manuscript. Nancy H. Brooks provided editorial assistance during the production process. Denise Thomas typed the many drafts. Kathryn Quattrone prepared the study for publication.

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SUMMARY

The debate about reducing the tax rate on capital gains has centered around the broad issues of revenue, fairness, and economic growth. The debate has generally focused on permanently reducing the tax rate on any qualifying asset, regardless of when the asset was purchased. However, reducing taxes on capital gains does not have to be carried out in this way. Other options are available. For example, a reduction could apply to all capital gains on all assets, but only temporarily; it could be permanent, but limited to capital gains on assets purchased after a certain date, or it could combine these features. As an illustration, the House of Representatives passed one capital gains option in 1989 that would have cut tax rates on capital gains from all assets temporarily, to be followed by a permanent reduction that would apply only to newly acquired assets. Investors will face different incentives in the short run depending on how a reduction in the tax rate on capital gains is carried out.

This study examines how the different ways of structuring a reduction in the tax rate on capital gains create different incentives in the short run. It shows that a prospective cut in capital gains taxes--that is, one limited to capital gains on newly purchased assets--would create stronger incentives for investors to realize gains on existing assets than would a retrospective tax reduction that applied to all capital gains (past as well as newly purchased assets) even though both types of tax reduction would provide similar incentives to invest in capital gains assets in the long run. (For a summary of options for cutting capital gains taxes, see Summary Box.)

The strong incentive to sell assets in the short run has potentially important policy implications. Because a prospective tax cut lowers the overall tax rate on gains only gradually as old (nonqualifying) portfolio assets are replaced with new (qualifying) assets, a prospective tax cut can avoid some of the revenue losses of a retrospective tax cut.

All capital gains realized in order to qualify for the lower rate on new assets as well as all of the realizations on capital gains that would have occurred anyway would be taxed at full rates under present law. Since a prospective tax cut is likely to elicit at least as large a volume of realizations on capital gains as a retrospective tax cut, the difference in short-term revenues could be substantial.

SUMMARY BOX
OPTIONS FOR CUTTING CAPITAL GAINS TAXES

Types of Capital Gains Tax Preference

Fixed Exclusion: Under a fixed exclusion, a portion of capital gains is excluded from taxable income. For example, before 1987, 60 percent of long-term capital gains was excluded from taxable income. Thus, a taxpayer in the top bracket at that time--50 percent--paid an effective rate on capital gains of 20 percent (50 percent reduced by the 60 percent exclusion).

Variable Exclusion: Under a variable exclusion, the portion of capital gains included in taxable income varies with how long an asset is held. For example, the Administration's 1990 budget proposed an exclusion that would range from 10 percent for assets held one year up to 30 percent for assets held more than three years.

Alternative Maximum Tax Rate: In 1987 and, again, for years after 1990, the Congress set a top tax rate on capital gains of 28 percent, while the top rate on other income was higher. The maximum tax rate is equivalent to an exclusion that only applies at high statutory tax rates.

Indexing: Under indexing, the basis (or purchase price) of capital gains assets is adjusted for inflation before the capital gain is computed. Thus, if an asset were purchased for $1,000 and sold for $3,000, and the price level had doubled over the intervening period, then the adjusted basis would be increased by indexing from $1,000 to $2,000 to account for the doubling in prices; thus, the indexed capital gain would be $1,000 ($3,000 minus $2,000).

Options for Determining Eligibility of Assets

Retrospective Tax Cut: A retrospective tax cut--for example, a retrospective exclusion--applies to all capital gains assets, regardless of when they were purchased. All past changes in capital gains tax laws have been retrospective.

Prospective Tax Cut: A prospective tax cut only applies to assets purchased after a certain date, such as the date of enactment of legislation. A prospective tax cut provides no direct benefit to assets that had been purchased before the effective date.

Temporary Tax Cut: Some proposals would only provide the capital gains tax preference for a fixed period of time, after which the preference would either expire or be replaced by a prospective tax reduction. While it is not uncommon for tax legislation to have an expiration date--to control revenue losses or to allow reevaluation of the benefits and costs of the legislation or both--a temporary cut in capital gains tax has never been in effect.

The way in which investors respond to a change in capital gains policy in the short run has another implication. Capital gains realized in response to retrospective tax changes reflect a reduction of the "lock-in effect"--the strong incentive to hold on to appreciated assets to avoid paying capital gains tax. This effect is often considered to be one of the primary defects of a capital gains tax based on realizations. Although greater turnover of assets with capital gains may improve the efficiency of financial markets, for example, by reducing the overall riskiness of investors' portfolios, higher turnover of assets also involves transaction costs. This paper discusses circumstances under which tax-induced selling is likely to be inefficient and suggests options to minimize this efficiency cost.

RELATIVE REVENUE EFFECTS OF RETROSPECTIVE AND PROSPECTIVE TAX CUTS

A retrospective tax cut encourages sales by lowering the cost of selling assets. A prospective tax cut also encourages sales, but by raising the after-tax rate of return on new investments relative to assets in the portfolio. This effect occurs because the prospective tax cut applies only to new investments. For the most common kinds of transactions, a prospective tax cut of a given magnitude provides a stronger incentive to sell than a retrospective tax cut of the same magnitude.

A prospective tax cut not only provides a strong incentive to sell assets, it also avoids almost all of the revenue losses that would occur under a retrospective cut on assets that would have been sold even if the tax law were not changed. In the short run, any induced sales of old assets are taxed at full rates under a prospective tax reduction, as opposed to the reduced rates under a retrospective cut.

An example illustrates why a prospective tax cut is likely to gain revenue in the short run compared with a retrospective tax cut. Suppose that with no change in tax law, capital gains realizations would be $200 billion and taxed at an average rate of 25 percent. Baseline revenues would be $50 billion. If a retrospective 50 percent exclusion would cause realizations to double in the short run (to $400 billion), the revenue cost of the retrospective tax cut would be zero. The increase in

realizations would just offset the exclusion. However, if the 50 percent exclusion were prospective and the same amount of realizations were induced in the short run, revenues would double. This doubling takes place because all of the induced realizations, as well as all of the realizations that would have occurred in the absence of a tax cut, would be fully taxed at the 25 percent rate. In this example, even if the realizations induced under the prospective tax cut were much smaller than under the retrospective change, the revenue effect would be positive. For example, if realizations increased by just 10 percent, or $20 billion, revenue would also increase by 10 percent, or $5 billion, as compared with zero revenue effect under the retrospective tax cut.

Over a sufficiently long period, a prospective and a retrospective tax cut have identical effects because all assets eventually qualify for the prospective tax cut. Despite this long-run equivalence, the short-run revenue gain under the prospective cut compared with the retrospective reduction is a permanent revenue gain. Revenue losses do not offset the short-run revenue gain over the long term. The reason is that the prospective tax cut does not provide any direct tax benefit for assets that were purchased before the effective date for the enacting legislation.

Some capital gains tax proposals have called for indexing the cost basis to offset the effects of inflation in place of a direct reduction in the tax rate through an exclusion. Since inflation is a substantial part of most capital gains, indexing provides a tax benefit equivalent to a substantial exclusion. Prospective indexing, which would only apply to newly purchased assets, would also provide a stronger incentive to sell assets in the short run than would a retrospective tax reduction. Another variation of indexing, which would index all assets (new and old) for future inflation, provides a similar incentive to sell assets as a retrospective exclusion.

Another option is a temporary exclusion followed by prospective indexing. The temporary exclusion applies to old assets (that is, retrospectively) as well as new ones. CBO's analytic model demonstrates that this option provides a strong incentive to sell assets--in fact, stronger than the incentive that existed at the end of 1986, when

capital gains realizations doubled in anticipation of the higher tax rates to take effect with the Tax Reform Act of 1986.

While a temporary tax cut would induce a large amount of realizations, whether such a cut would raise more or less revenue than a prospective tax cut is uncertain. This uncertainty arises because the temporary tax cut must induce enough new realizations to offset the revenue lost on sales that would have occurred without a tax cut (sometimes called the static revenue loss). But note that the short-term revenues under either a temporary or retrospective tax cut are at the expense of future tax revenues. Furthermore, in the case of the temporary tax cut, this acceleration of revenues is on unfavorable terms to the government. The government loses more in future revenues, when discounted back to the present, than it gains in the near term.

ARE THE INDUCED SALES OF ASSETS EFFICIENT?

Any capital gains tax cut will induce sales of assets. What is unclear is whether the induced selling under any of these proposals improves the allocation of economic resources. On the one hand, investors are encouraged to balance their portfolios to achieve a more desirable mix of assets. Depending on what motivates the investors' decisions, this encouragement to balance portfolios may or may not be efficient for the economy. On the other hand, prospective or temporary tax cuts may encourage sales of assets that would not be sold even without taxes. These sales occur because of the one-time opportunity to secure a tax benefit or opportunity to secure a relative tax advantage, neither of which would be present in the absence of any tax. This kind of churning--that is, selling assets purely for tax purposes--is clearly inefficient. To limit this kind of inefficiency, temporary or prospective proposals must allow a taxpayer to "mark to market"--that is, pretend that an asset had been sold for tax purposes, without actually requiring the asset to change hands.

POLICY IMPLICATIONS

This paper has limited relevance to the current political debate about the merits of a cut in the capital gains tax. For example, it does not address the question of whether reducing the tax rate on capital gains is superior to fully taxing capital gains. However, the study shows that a prospective cut has certain advantages as compared with other alternatives for reducing the tax burden on capital gains. It concludes that, if the taxation of gains is reduced, a prospective capital gains tax cut is superior, in terms of long-run federal budget effects, to retrospective or temporary tax cuts.

CHAPTER I

HOW CAPITAL GAINS TAX RATES AFFECT THE INCENTIVE TO SELL ASSETS

The sometimes passionate debate about the revenue and policy implications of a cut in the capital gains tax rate has often overlooked the fundamental question of how such a tax cut should be carried out. Should the tax cut apply to all assets or only those purchased after a certain date? Should part of long-term gains be excluded from taxable income, or should there be an alternative maximum tax rate? Should capital gains be indexed for inflation? If the tax cut takes the form of an exclusion, should the percentage excluded vary with the holding period and, if so, how? The choices among these options can dramatically affect the revenue and policy issues at the heart of the debate.

OPTIONS AND DEFINITIONS

There are three ways to phase in a capital gains tax cut. The first is a *retrospective* tax cut. A retrospective change applies to assets regardless of when they were purchased. All past changes in capital gains tax law have been retrospective.

The second transition option is to make the tax cut *prospective*. A prospective tax cut would only apply to assets purchased after the effective date for the tax legislation. Capital gains on any asset purchased before that date would be subject to full taxation on sale.

Proposals for prospective tax reduction may include a *mark-to-market* provision. This option would allow a taxpayer to pay tax on the accumulated capital gain on an asset without actually selling it. Then, any subsequent gain would qualify for the prospective tax cut. A mark-to-market election would limit the amount of purely tax motivated selling of assets that would occur under a prospective tax cut.

A third option is to impose a *temporary* cut in the capital gains tax rate. Under a temporary cut, assets would only qualify for special treatment if they are disposed of during a limited time period--for example, one or two years. Some proposals for a temporary reduction in capital gains taxes have included a prospective tax cut that would follow the temporary reduction.

The effective tax rate on capital gains may be reduced in many ways. The most straightforward, and the one most common in historical experience, is a fixed exclusion. Under a *fixed exclusion*, a set percentage of capital gains is excluded from taxable income. Effectively, a fixed exclusion reduces the tax rate on capital gains by the percentage of exclusion.

Another option, embodied in the Administration's 1990 budget, is a *variable exclusion*. Under a variable exclusion, the percentage of capital gains included in taxable income declines with the holding period. Such an exclusion is aimed at encouraging taxpayers to hold assets for the longer term.

Yet another variation is an explicit *alternative maximum tax rate* on capital gains. An alternative maximum tax rate would cap the rate on capital gains at some level below the top statutory rate--for example, 15 percent. As a practical matter, the alternative rate would have similar incentive effects as an exclusion applied to the top tax rate, but the benefits of the exclusion would only apply to high-bracket (and thus high-income) taxpayers.

Some proposals have called for *indexing* capital gains for inflation. Under full indexing, the *basis* or purchase price is increased to reflect inflation between the purchase and sales date of the asset. For example, if the general price level had doubled since an asset was purchased, its basis would be doubled for the purpose of computing the taxable gain or loss.

Indexing can be either prospective or retrospective. Prospective indexing would only index the basis of assets purchased after a certain date. Retrospective indexing can mean one of two things. Full retrospective indexing would fully index the basis of all assets purchased,

regardless of their purchase date. The more common variation of retrospective indexing in recent proposals would index the basis of all assets, but only for inflation that occurs after a certain date.

FACTORS DETERMINING HOW TAXPAYERS WILL RESPOND

Some taxpayers will sell assets when taxes on capital gains are reduced. This tax-motivated selling of assets affects tax revenue. Such sales also affect market efficiency because they are costly and result in a different allocation of capital among individuals and markets.

How taxpayers respond to a capital gains tax cut depends on whether the tax cut is prospective, retrospective, or temporary. A retrospective tax cut applied to all capital gains lowers the cost of selling capital gains assets currently held in the investor's portfolio while also raising the after-tax return from either continuing to hold these existing assets or purchasing new assets. This effect takes place because all capital gains are taxed at a lower rate so the after-tax income is higher. Because assets currently held in portfolio do not qualify for the preferential tax rate a prospective tax limited to capital gains on newly acquired assets affects neither the cost of selling old assets nor the return from continuing to hold old assets.[1] But a prospective tax cut raises the after-tax return on all newly purchased capital gains assets. A temporary tax cut may combine these features.

Reasons for Selling Assets

An individual may sell capital gains assets for several reasons. First, the individual may believe that some other capital gains asset is likely to pay a higher rate of return. Second, an individual investor may find himself or herself holding more of a particular asset than is consistent with diversification among investments to avoid risk. This situation

1. If the capital gains tax reduction is capitalized in the form of higher asset prices, there could be an indirect effect. This effect would increase capital gains of holders of old assets and exacerbate lock-in. The effects of this capitalization on revenues is hard to determine because, on the one hand, it would create a disincentive to sell. On the other hand, assets that are sold would have higher capital gains than they would have without the price increase. The issue of capitalization is ignored in the remainder of the paper.

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might occur if an asset had grown rapidly in value and now accounts for a much larger share of the portfolio than it had originally. Third, the individual may sell an asset to reduce outstanding debt or to reinvest funds in assets paying returns in a form other than capital gains. Fourth, an individual may sell an asset to finance consumption or purchase durable goods, such as a car or a house.

Selling for Reinvestment. Investors who are prompted to sell capital gains assets by a permanent cut in the capital gains tax rate, whether the cut is retrospective or prospective, are most likely to do so for the first two reasons described above. The proceeds from such tax-motivated sales would thus be reinvested in other capital gains assets.

On the whole, taxpayers would be unlikely to sell assets to reduce debt or invest in income-producing (that is, not capital gains-producing) assets. Reducing taxes on capital gains raises the after-tax rate of return on capital gain assets relative to income-producing assets and relative to the cost of borrowing. Thus, a permanent cut in taxes on capital gains encourages investors to sell income-producing assets or borrow more in order to buy more capital gains assets.

Selling for Consumption. Would a cut in capital gains taxes prompt taxpayers to sell capital gains assets to finance higher consumption spending? The answer is unclear. Cutting taxes on capital gains raises the after-tax return to all saving. The capital gains tax cut forces other assets to pay a somewhat higher rate of return to compete for funds with capital gains assets. Most empirical studies find that a higher after-tax return to savings would cause households to maintain or to increase modestly the amount saved. Based on this evidence, assets are generally unlikely to be sold to finance increased consumption.

Sales of capital gains assets that investors otherwise plan to bequeath to their heirs may be an important exception. Because taxes are collected on capital gains realized during one's lifetime, but not on capital gains held until death, it costs investors less than $1 in terms of forgone consumption to leave a bequest of $1. Lowering taxes on capital gains raises the cost of bequests relative to consumption. If the desired level of bequests is sensitive to changes in this relative cost, consumption would increase at the expense of bequests, and some in-

vestors would respond to lower taxes on capital gains by selling assets in order to consume more during their lifetimes. This increased consumption could offset part or all of the induced savings in response to higher rates of return.

The Unlocking Effect

A retrospective or temporary tax cut induces sales of capital gains assets by lowering the tax cost of selling. At a tax rate of 28 percent, selling an asset with a $1,000 capital gain costs $280. At a tax rate of 20 percent, selling the same asset would only cost $200. If selling has some economic value, then more trades would occur at the lower price. In other words, a taxpayer would be more likely to sell an asset if it cost $200 to do so than if it cost $280.

This effect is called the *unlocking effect.* The unlocking effect refers to how lower capital gains tax rates on old assets reduce the cost of selling. This cost of selling, which deters realizing capital gains, is commonly referred to as the lock-in effect.[2] Some view it as one of the primary defects of a capital gains tax based on realization. A retrospective or temporary tax cut encourages sales of assets through the unlocking effect.

The Relative-Return Effect

A prospective tax cut stimulates sales of assets by raising the after-tax rate of return of new investments relative to those currently held in investors' portfolios. For example, if a 28 percent tax rate is replaced by a 20 percent rate that applies only to new investments, then every additional $1,000 of capital gain in a portfolio asset accumulates $280 of tax liability if the portfolio asset is not going to be held until death. In contrast, every $1,000 of capital gain on a new investment is only subject to $200 of tax liability. While the portfolio asset benefits from deferral of tax liability if it is held, the prospective tax cut makes new

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2. The seminal article on the lock-in effect is Charles C. Holt and John P. Shelton, "The Lock-In Effect of the Capital Gains Tax," *National Tax Journal*, vol. 15, no. 4 (December 1962).

investments relatively more attractive than they would have been if prior tax law were not changed.

This effect is called the *relative-return effect*. A prospective tax cut raises the after-tax rate of return on all new capital investments relative to assets that are in the portfolio. In contrast, because a retrospective tax cut applies equally to old and new assets, it does not change the relative after-tax returns earned per dollar invested in either asset Thus, there is no relative-return effect under a retrospective tax reduction. Retrospective indexing is an exception. Under retrospective indexing, a kind of relative-return effect takes place as explained below.

Temporary capital gains tax cuts may combine both the unlocking and the relative-return effects. If a prospective tax cut follows the temporary cut in tax rates, taxpayers have an incentive to sell--first because the cost of selling is temporarily reduced and, second, because newly purchased assets qualify for preferential tax treatment.

CHAPTER II

EVALUATION OF OPTIONS

Different capital gains tax policies would have different effects on the relative-return and unlocking effects for different kinds of assets. This section explores those effects by using a quantitative measure of the incentive to sell assets in a portfolio. The measure is the rate of return at which a rational investor would be just willing to sell a portfolio asset in favor of an alternative investment. A policy that raises this threshold rate of return would induce more sales of assets because more assets would have expected returns below the threshold.

It has long been understood that a retrospective capital gains exclusion could induce many sales of assets in the short run through the unlocking effect. The analysis of threshold returns confirms this. However, the analysis also suggests several surprising conclusions. For example, a prospective tax cut, which would only apply to newly purchased assets, can provide an even greater incentive to sell assets through the relative-return effect even though the tax incentive is phased in slowly. Another somewhat surprising result is that two options to index capital gains against inflation combine the relative-return and unlocking effects and may thus provide very strong incentives to sell assets in the short run.

The following analysis evaluates most of the capital gains options that the Congress has seriously considered and compares them with the last significant capital gains experiment, which was the Tax Reform Act of 1986.

THE MARGINAL ASSET AND THRESHOLD RETURN

How does an individual decide which assets to sell? A simple model of capital gains trading assumes that investors compare in each period the expected after-tax return of holding each asset in a portfolio with

the after-tax return from purchasing the best possible alternative assets.[1] Individuals sell assets if they can increase after-tax future wealth by purchasing an alternative asset. This model ignores risk--a common feature of portfolio choice models--to keep the analysis simple and focused.

The incentive to sell assets at any point in time may be described in terms of the incentive to hold or to sell a marginal asset, which is an asset that the investor would be just willing to hold, given its current tax treatment and expectations about future returns. For this marginal asset, the after-tax return from holding is exactly the same as the after-tax return from selling the asset and purchasing the best alternative investment. Owers would hold assets that are expected to yield higher returns than the marginal asset and would sell assets that are expected to yield lower returns. The marginal asset is simply a convenient baseline. If an asset is held in portfolio, then it must be true that it is at least as desirable as the "marginal asset" and, if an asset is sold, then that asset must be no better than the "marginal asset." The marginal asset itself does not have to exist. It is simply a dividing line between assets that would be held and those that would be sold.

Because of the capital gains tax, whether an asset is marginal depends not only on the expected rates of return of the asset and the best alternative investment, but also on the amount of accrued capital gain. Under present law, if an asset has a large accrued capital gain, the tax cost of selling is relatively high. Thus, an investor may hold the asset even if its expected future pretax return were less than the pretax return from another investment. This result does not necessarily hold if capital gains tax rates were cut prospectively. (See the discussion of marking to market below.) At the other extreme, if an asset had zero accrued gain, the investor would be willing to sell an asset and buy another that paid only a slightly higher rate of return (assuming that sales costs are negligible).

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1. Donald W. Kiefer, "Lock-In Effect Within a Simple Model of Corporate Stock Trading," *National Tax Journal*, vol. 43, no. 1 (March 1990).

The marginal asset is characterized numerically in terms of a threshold return. The threshold return is the pretax total return on a new investment that would make the investor indifferent between holding and selling a given portfolio asset. For example, if a given portfolio asset was expected to earn a pretax return of 8 percent over a five- year holding period, and 50 percent of the asset's current market value represented a taxable capital gain, another investment would have to earn at least 11.1 percent a year to induce the sale of the portfolio asset by a taxpayer in the 28 percent tax bracket. Over the five-year period, the value of the other investment would have to increase by at least 116 percent of the return on the portfolio asset. The threshold return is thus 116 percent. (These computations are illustrated in Table 1 and discussed in detail in the next section.) For analytic simplicity, all returns are expressed as the total increase in value over a holding period rather than as an annual rate of return. This characterization does not affect any qualitative results.

Measuring the actual threshold return for a particular investor or for the market as a whole is not possible, since threshold returns depend on individuals' expectations, which are unobservable. However, it is possible to see how changes in taxation would change threshold returns. If a tax law raises threshold returns, then fewer capital gains assets would be sold. If a new tax law reduces threshold returns, then more capital gains assets would be sold.

THE THRESHOLD RETURN UNDER PRESENT LAW

This section illustrates how to determine the threshold returns that would induce the sale of portfolio assets in three cases. The first case is where both the portfolio asset and another investment would be held for the same number of years and sold before death. The second case is where both the portfolio and the other asset would be held until death. The third case is where the portfolio asset would be held until death, but the alternative would be held for a shorter period.

TABLE 1. EXAMPLES OF COMPUTATIONS OF THRESHOLD RETURNS

	Holding Period Strategy: Neither Asset Held Until Death		
	(1) Present Law	(2) Retrospective Exclusion	(3) Prospective Exclusion
I. Computing the After-Tax Value of Portfolio Assets (A)			
Assumptions			
(1) Purchase price	$500	$500	$500
(2) Current price	$1,000	$1,000	$1,000
(3) Future price if held	$2,000	$2,000	$2,000
Computation of value of holding A			
(4) Capital gain if held: (3)-(1)	$1,500	$1,500	$1,500
(5) Gains tax rate if held (Percentage)	28.0	19.6	28.0
(6) Future capital gains tax: (5)*(4)	$420	$294	$420
(7) After-tax value: (3)-(6)	$1,580	$1,706	$1,580
II. Computing the Required Threshold Return on Alternative Asset (B)			
Computation of proceeds from current sale of A			
(8) Current capital gain: (2)-(1)	$500	$500	$500
(9) Current gains tax rate (Percentage)	28.0	19.6	28.0
(10) Current tax: (9)*(8)	$140	$98	$140
(11) Amount available to invest in B: (2)-(10)	$860	$902	$860
Computation of threshold return			
(12) Required after-tax gain on B: (7)-(11)	$720	$804	$720
(13) Gains tax rate on B (percentage)	28.0	19.6	19.6
(14) Equivalent pretax gain on B	$1,000	$1,000	$896
(15) Threshold return: (14) as percentage of (11)	116	111	104

(Continued)

SOURCE: Congressional Budget Office.

TABLE 1. Continued

Holding Period Strategy					
Both Held Until Death			Portfolio Asset Held Until Death		
(4) Present Law	(5) Retrospective Exclusion	(6) Prospective Exclusion	(7) Present Law	(8) Retrospective Exclusion	(9) Prospective Exclusion
$500	$500	$500	$500	$500	$500
$1,000	$1,000	$1,000	$1,000	$1,000	$1,000
$2,000	$2,000	$2,000	$2,000	$2,000	$2,000
$1,500	$1,500	$1,500	$1,500	$1,500	$1,500
0.0	0.0	0.0	0.0	0.0	0.0
$0	$0	$0	$0	$0	$0
$2,000	$2,000	$2,000	$2,000	$2,000	$2,000
$500	$500	$500	$500	$500	$500
28.0	19.6	28.0	28.0	19.6	28.0
$140	$98	$140	$140	$98	$140
$860	$902	$860	$860	$902	$860
$1,140	$1,098	$1,140	$1,140	$1,098	$1,140
0.0	0.0	0.0	28.0	19.6	19.6
$1,140	$1,098	$1,140	$1,583	$1,366	$1,418
133	122	133	184	151	165

NOTES: In the last case, where the portfolio asset is held until death, the future price is discounted to the holding period for the alternative asset for comparability. The pretax equivalent is computed by dividing the after-tax gain by one minus the tax rate.

Case I: Neither Asset is Held Until Death

The threshold return can be computed for a hypothetical investor under present law, as shown in the first column of Table 1. Suppose that the hypothetical investor is in the 28 percent tax bracket and suppose that he or she is holding an asset (A) that is currently valued at $1,000 and will increase in value by 100 percent ($1,000) over the anticipated holding period. Suppose also that the asset was purchased for $500. If the asset is held, the investor will sell it for $2,000 and pay $420 in tax (28 percent of a gain of $1,500). Thus, the net proceeds will equal $1,580 if the asset is held.

For an alternative investment (B) that is held for the same amount of time to be as desirable as holding A, it would have to yield the same after-tax amount, $1,580. If the investor sells the portfolio asset now, he or she will have $860 to reinvest ($1,000 less capital gains tax of 28 percent of $500). To yield $1,580 after tax, a new asset would have to produce an after-tax capital gain of $720, which is equivalent to a $1,000 pretax gain at a 28 percent tax rate. In other words, the alternative investment would have to increase in value by 116 percent ($1,000 divided by $860). This gross return of 116 percent is the threshold return for the example.

Over the same holding period, B has to pay a higher return (116 percent) than A (100 percent) because of the capital gains tax. This is an example of the lock-in effect. If the capital gain in the portfolio asset were higher, the threshold return would be higher as well. If the capital gain were zero, the threshold return would be identical to the return for the portfolio asset.

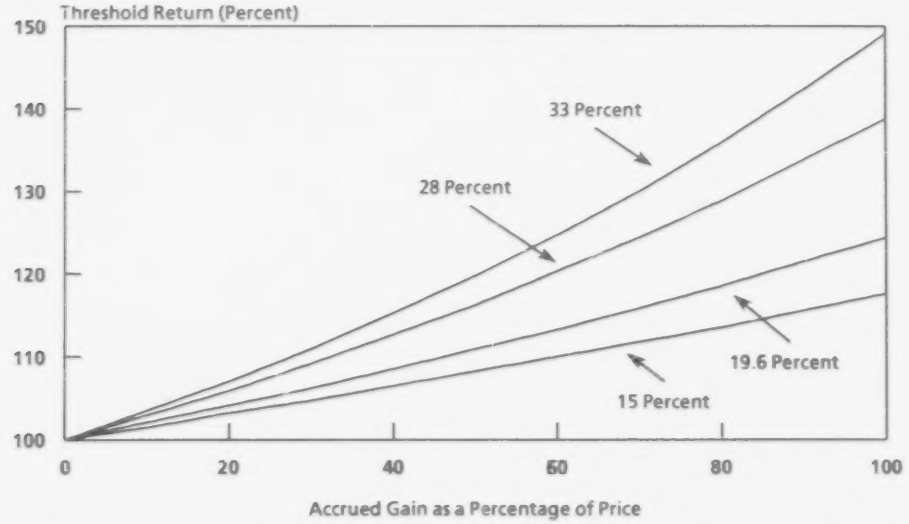
Note that the relationship between the threshold return relative to the return on the portfolio asset depends only on the tax rate and the percentage of current value that represents a capital gain. It does not depend on the level of return expected on the portfolio asset. The relationship between threshold return and accumulated capital gain in the portfolio asset is illustrated in Figure 1 for different marginal tax rates. (The number in the examples may not exactly match points on the figures because the examples were rounded.) The analytic rela-

tionship shown in this and subsequent figures is explained in Appendix B.

Case II: Both Assets are Held Until Death

A similar comparison would be made if the investor intended to hold either the portfolio or the other asset until death. In this case, the taxpayer must balance the option of earning a tax-free return on the portfolio asset against the tax costs of selling the asset now and reinvesting in another asset that would also produce a tax-free return. The return on the other asset must generally be higher than the return on the portfolio asset to compensate for the tax cost of selling now.

Figure 1.
Threshold Return by Accrued Gain and Marginal Tax Rate When Neither Asset Would be Held Until Death



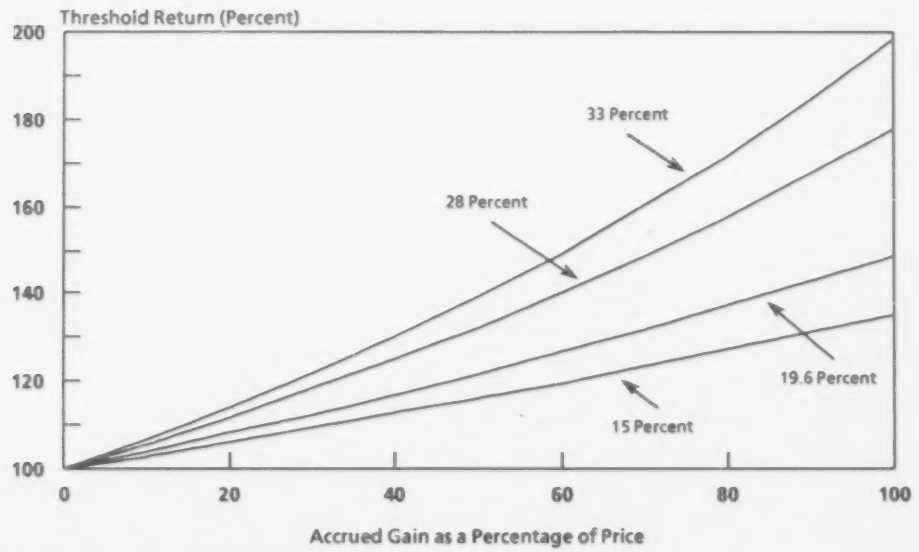
SOURCE: Congressional Budget Office.

NOTE: The portfolio asset is assumed to double in value over the holding period.

In computing the threshold return in this case, to simplify matters, it is assumed that the portfolio asset would double in value, as in the example where the asset was to be held for a shorter period. If the portfolio asset is held, it yields $2,000 tax-free at death. If it is sold, the after-tax proceeds are $860, as explained above. That $860 must grow to $2,000, which in percentage terms represents a 133 percent increase. This is the threshold return for the example. It is higher than the return in the case where both assets would be sold during life. (See column 4 of Table 1 for the computation of the threshold return in this case.)

Depending on the tax rate and the amount of accrued capital gains in the portfolio asset, the threshold return can exceed the return in Case I by as much as 50 percentage points. Figure 2 illustrates the pattern of threshold returns in this case.

Figure 2.
Threshold Return by Accrued Gain and Marginal Tax Rate When Both Assets Would be Held Until Death



SOURCE: Congressional Budget Office.

NOTE: The portfolio asset is assumed to double in value over the holding period.

Case III: Portfolio Asset is Held Until Death

The previous two cases assume that both the portfolio asset and the alternative asset would be held for the same length of time. The characteristics of either the portfolio or the other asset, however, could cause the holding period of the alternative asset to differ from that of the portfolio asset. For example, an investor intending to hold an asset until death might be confronted with another investment paying a relatively attractive return, but only if held for 10 years.

If there were no capital gains taxes, the investor would be better off by selling the portfolio asset, buying the alternative asset, holding it for 10 years, and then selling it to buy back the portfolio asset that would then be held until death.

If capital gains are taxed, it may not be advantageous to sell the portfolio asset unless the alternative pays a sufficiently greater return. Computing this threshold return is more complicated than in the previous two cases. The details of the computation are described in Appendix A.

How are the threshold returns calculated for the alternative investments that would not be held until death? As in the previous two examples, the portfolio asset is assumed to double in value. These thresholds are higher than in either of the two previous cases because the portfolio asset would be untaxed if held, whereas taxes would have to be paid twice if another asset is purchased (see Figure 3).

Figure 3 also shows that the threshold return is much more sensitive to tax rates when the portfolio asset, but not the alternative asset, would be held until death. The incentive to remain locked in to the existing investment is stronger for assets held until death and, therefore, reductions in the tax rate produce more dramatic effects as the unlocking effect intensifies. Some analysts believe that this is a compelling argument for cutting capital gains tax rates, but other analysts might infer that capital gains should be taxed at death. Cutting capital gains tax rates in half would not reduce the threshold return by as much as fully taxing capital gains at death. Although Figure 3

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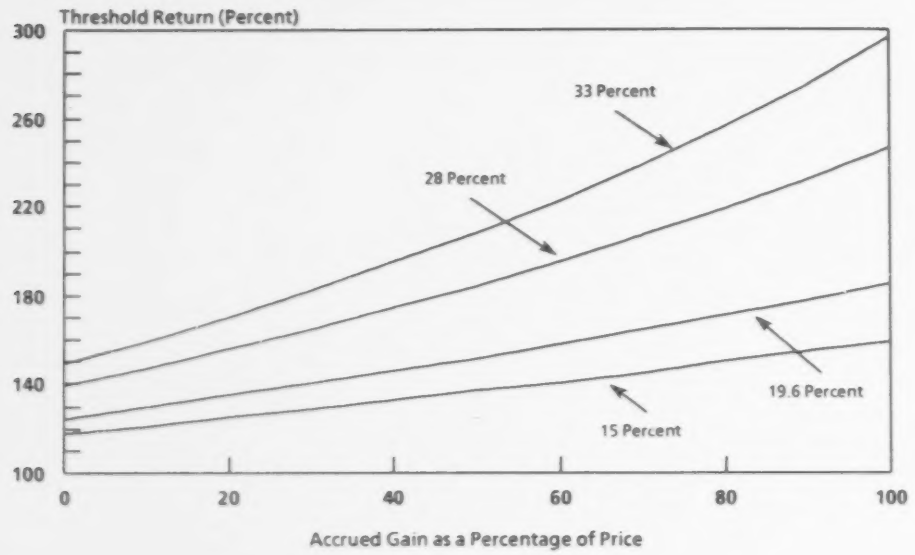
Figure 3.
Threshold Return by Accrued Gain and Marginal Tax Rate When Portfolio Asset Would be Held Until Death



SOURCE: Congressional Budget Office.

NOTE: The portfolio asset is assumed to double in present value discounted to the holding period for the alternative asset.

depends on more assumptions than Figure 1, the qualitative conclusions are not affected by changes in the assumed holding period for the alternative investment or (equivalently) differences in the discount rate between the alternative holding period and death.

THE THRESHOLD RETURN UNDER A RETROSPECTIVE EXCLUSION

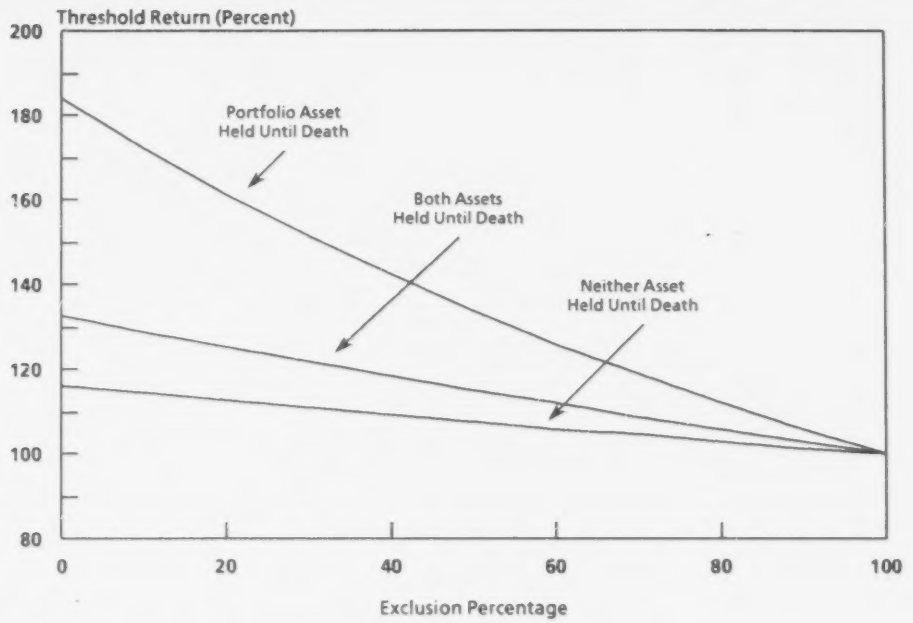
A retrospective exclusion reduces the threshold return and stimulates short-run sales of capital gains assets through the unlocking effect. It is equivalent to reducing the tax rate on capital gains. As Figures 1 through 3 showed, the threshold return declines with the capital gains tax rate, so more assets would be sold under an exclusion than under

present law. For example, under a 30 percent exclusion, as called for in some proposals, a taxpayer in the 28 percent tax bracket would face an effective capital gains tax rate of 19.6 percent. In the first case discussed above where neither the portfolio nor the alternative asset would be held until death, the threshold return would decline by about one-third. Table 1 shows that the threshold return would be 116 percent of the return on the portfolio asset under present law at a tax rate of 28 percent. Under a 30 percent retrospective exclusion (column 2), the threshold return would decline to 111 percent.

Numerical examples illustrate how an exclusion would affect the threshold return in each of the three cases discussed above (see Table 1). These examples show that a retrospective exclusion reduces threshold returns in each case because of the unlocking effect on the sale of the portfolio asset. In the third case where the portfolio asset would be held until death but the alternative asset would not, reducing taxes on all capital gains has a relative-return as well as an unlocking effect. The retrospective exclusion raises the after-tax rate of return of the alternative asset while leaving the rate of return of the portfolio asset unchanged (since it is untaxed). In this case, a retrospective exclusion results in the largest reductions in the threshold return--from 184 percent under present law (see column 7 of Table 1) to 151 percent under the exclusion (see column 8 of Table 1). Even with such reductions, however, the threshold return is still extremely high. Thus, it is doubtful how much a retrospective exclusion would stimulate trades with these particular characteristics.

Although the threshold return decreases as the percentage of capital gains excluded from taxable income increases, the magnitude of this unlocking effect depends on whether the assets would be held until death (see Figure 4). An exclusion reduces the threshold return most in the case where the portfolio asset would be held until death and the alternative asset would not. An exclusion has the least effect in the case where neither asset would be held until death.

Figure 4.
Threshold Return by Percentage of Gain Excluded and Whether Assets Would be Held Until Death Under a Retrospective Exclusion



SOURCE: Congressional Budget Office.

NOTE: The portfolio asset is assumed to double in value; the accrued gain in the portfolio asset equals 50 percent of the current price; the tax rate on ordinary income is 28 percent.

THE THRESHOLD RETURN UNDER A PROSPECTIVE EXCLUSION

As explained earlier, a prospective tax reduction encourages asset sales by the relative-return effect. The prospective tax cut raises the after-tax rate of return of new investments compared with the after-tax rates of return on investments in a portfolio. Thus, some portfolio assets that would be marginal under present law become economically less attractive than alternative assets under the prospective tax reduction. The incentive to sell such assets can be quite strong.

Calculating how a prospective tax cut affects incentives to sell portfolio assets is somewhat more complicated than in the case of a retrospective exclusion because the investor faces two different tax rates in the short run. The present law tax rate--28 percent in the examples--applies to sales of the portfolio asset, either now or after some holding period less than a lifetime. The preferential tax rate--for example, 19.6 percent--applies to a subsequent sale of a newly purchased asset. Aside from this minor complication, however, the computations are identical.

Neither Asset Is Held Until Death

In the example where neither asset is held until death, the after-tax proceeds from holding the portfolio asset would remain unchanged at $1,580 (see column 3 of Table 1). The reason is because the present law tax rate of 28 percent applies to the portfolio asset under a prospective tax change.

As in the previous example, the alternative asset would have to yield at least $1,580 after tax to compete with the portfolio asset. The amount of money to be reinvested in the other asset would also remain unchanged at $860 because the accrued gain is taxed at the full 28 percent rate. At the prospective tax rate of 19.6 percent, however, the alternative asset would only have to pay a $896 pretax gain to yield the required $720 after tax. This threshold return amounts to 104 percent ($896/$860), which is only slightly above the rate of return on the portfolio asset. Moreover, this threshold return is only 90 percent of the threshold return under present law. A prospective tax cut would thus result in more sales of portfolio assets than would occur under present law.

In fact, the threshold return would be less than 100 percent (that is, less than the return on the portfolio asset) if the accrued gain were much less than 50 percent. In this case, the taxpayer would have an incentive to recognize a capital gain and repurchase the portfolio asset. This phenomenon is analyzed below in the section on "mark-to-market."

Both Assets Held Until Death

In the case where both assets would be held until death, a prospective tax cut has no effect (see column 6 of Table 1). Since both assets are held until death, the effective tax rate on future gains is zero in both cases. If the portfolio asset is sold, the tax burden is the same as under present law because the prospective tax rate does not apply. Thus, a prospective tax reduction has no effect on the threshold return as compared with present law in this case.

Portfolio Asset Held Until Death

In the case where the portfolio asset would be held until death, but the alternative would not, the threshold return is quite high under present law because the portfolio asset would escape tax. A prospective tax cut lowers the threshold somewhat through the relative-return effect.

As under present law, the asset held until death is worth $2,000 expressed in the present value equivalent of the alternative asset. For that asset to yield $2,000 after tax, it must generate a $1,140 after-tax gain relative to the $860 available for reinvestment. At a tax rate of 19.6 percent, this after-tax gain is equivalent to a pretax gain of $1,418. This amount represents a threshold return of 164.9 percent (see column 9 of Table 1). While this return is still quite high, it is only 90 percent of the threshold under present law.

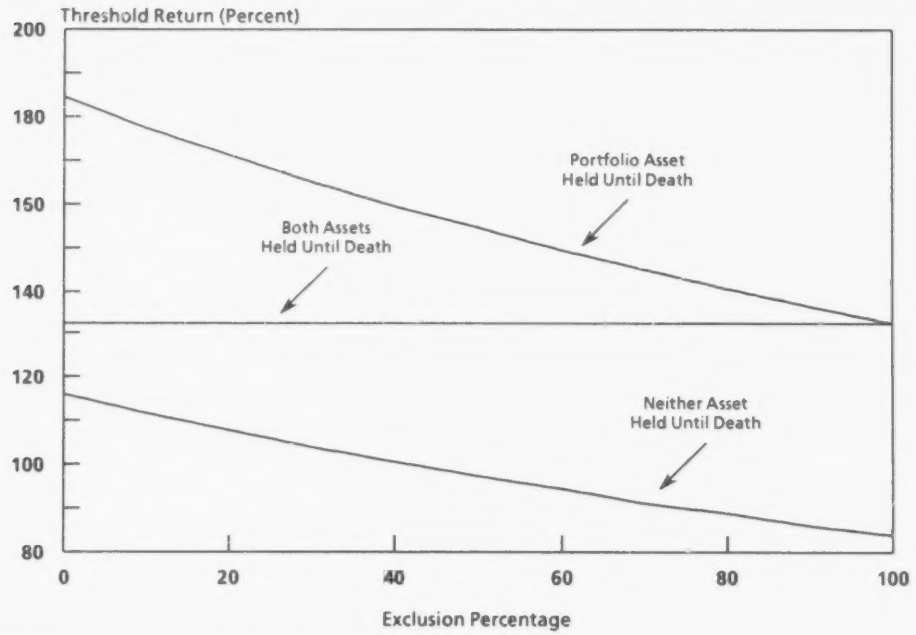
This proportional reduction in the threshold return is the same as in the case where neither asset would be held until death because the relative-return effect is the same. The reason is that the relative-return effect only depends on the tax rate on the alternative asset.

Summary of Threshold Returns in the Three Cases

The incentives created under a prospective exclusion thus depend crucially on how long assets would be held. A prospective tax cut would reduce threshold returns most when neither the portfolio asset nor the other asset would be held until death. The same policy has no effect

when both assets would be held until death. In the third case in which only the portfolio asset would be held until death, the threshold return is reduced by a prospective exclusion, but the threshold remains extremely high--probably prohibitively high. Figure 5 illustrates the comparative effects.

Figure 5.
Threshold Return by Percentage of Gain Excluded and Whether Assets Would be Held Until Death Under a Prospective Exclusion



SOURCE: Congressional Budget Office.

NOTE: The portfolio asset is assumed to double in value; the accrued gain in the portfolio asset equals 50 percent of the current price; the tax rate on ordinary income is 28 percent.

COMPARISON OF A RETROSPECTIVE AND PROSPECTIVE EXCLUSION

The above examples show that both retrospective and prospective exclusions reduce the threshold return at which other investments become attractive relative to portfolio assets. Both ways of carrying out a cut in the capital gains tax would induce selling portfolio assets in the short run. However, these alternatives would encourage different types of trades. This section demonstrates that:

- A prospective exclusion provides a stronger incentive to sell assets that would not otherwise be held until death than a retrospective exclusion;
- In some cases, a prospective exclusion would cause taxpayers to voluntarily realize a capital gain, rather than defer the gain until sale, even if the taxpayer wanted to repurchase the portfolio asset;
- A retrospective exclusion provides a stronger incentive to sell assets that would otherwise be held until death than a prospective exclusion;
- A retrospective exclusion provides the largest incentive to sell assets that have large accrued gains, whereas a prospective exclusion provides the largest absolute incentive for assets that have smaller accrued gains; and
- If a retrospective exclusion would result in more asset sales than a prospective exclusion, the additional sales probably finance increased consumption (with a corresponding decrease in savings).

Assets That Would Not Be Held Until Death

The prospective exclusion provides a substantial incentive to sell assets that would not otherwise be held until death. For example, for a

taxpayer in the 28 percent marginal tax bracket, a 30 percent exclusion applied prospectively reduces the threshold return by 10 percent relative to present law. This amount does not depend on the amount of accrued gain in the portfolio asset.

In contrast, an equal retrospective exclusion only reduces the threshold return by this much in the extreme case of an asset with a zero basis, so that the entire value comprises capital gains. The incentive to sell the marginal asset under a retrospective exclusion falls with the ratio of capital gain to asset value. Where there is no accrued gain, a retrospective exclusion provides no tax incentive to sell assets.

The threshold return is greatest when a large fraction of the asset's value represents a capital gain (see Figure 6 for a comparison of the prospective and retrospective exclusions). Although both the retrospective and prospective exclusions reduce the threshold return significantly, it could still be quite large: nearly 125 percent in the case of 100 percent gain. Much of the induced realizations is therefore unlikely to come from assets with large gains. For assets with smaller capital gains, however, the prospective exclusion continues to provide the same proportional incentive, whereas the incentive diminishes under the retrospective exclusion. Thus, the prospective exclusion provides a much larger incentive to sell for the type of trades that are most likely to respond to changes in capital gain tax rates.

In some cases, the prospective exclusion reduces the threshold return by enough to make it worthwhile for taxpayers to sell portfolio assets and buy back virtually identical assets. In the specific case illustrated in Figure 6, for example, this scenario would occur if the accrued gain were less than 40 percent of the price. At that level of gain, the threshold return is about equal to the expected return on the portfolio asset. A taxpayer could thus increase his or her ultimate wealth by selling the portfolio asset, paying tax on the accrued gain, and purchasing part of the asset back again with the proceeds from the sale. Some proposals for capital gains tax reduction have recognized this incentive and allowed mark-to-market elections that would allow taxpayers to achieve the same result without actually having to sell assets and buy them back again.

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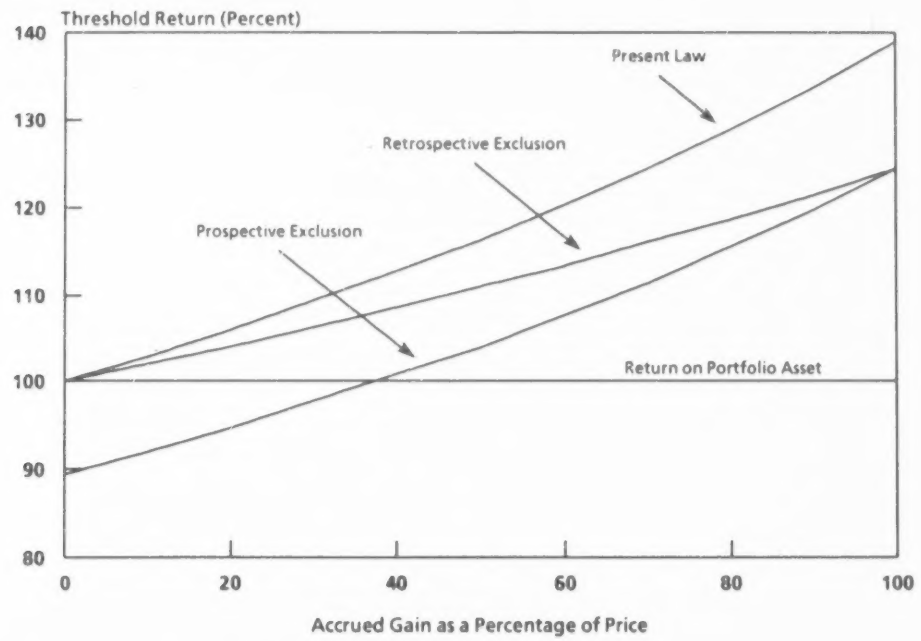
The analysis implies that in the short run a prospective exclusion can be expected to prompt a considerable volume of tax-motivated sales of assets that are not intended to be held until death. The retrospective exclusion provides less of an incentive, although it would still stimulate more sales than under present law.

Figure 6.
Threshold Return by Accrued Gain Under Retrospective and Prospective Exclusions When Neither Asset Would be Held Until Death



SOURCE: Congressional Budget Office.

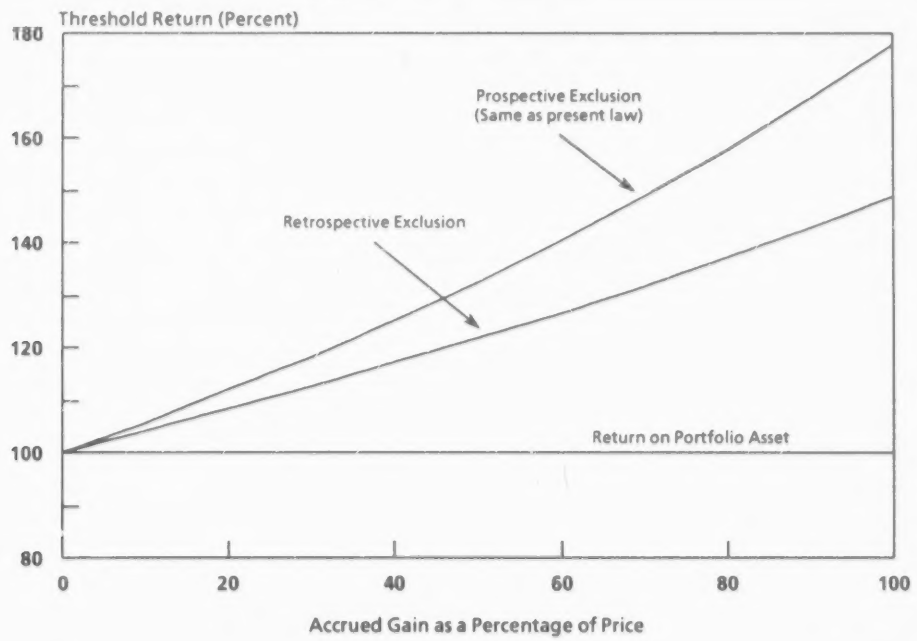
NOTE: The portfolio asset is assumed to double in value; the marginal tax rate on ordinary income is 28 percent and the exclusion is 30 percent.

Assets That Would Be Held Until Death

A retrospective exclusion generally provides a stronger incentive to sell assets that would otherwise be held until death than a prospective exclusion. This finding is demonstrated in Figure 7 and Figure 8.

Suppose threshold returns under a retrospective and prospective exclusion are compared with the threshold return under present law. Further, assume that both the portfolio and the alternative asset

Figure 7.
Threshold Return by Accrued Gain Under Retrospective and Prospective Exclusions When Both Assets Would be Held Until Death



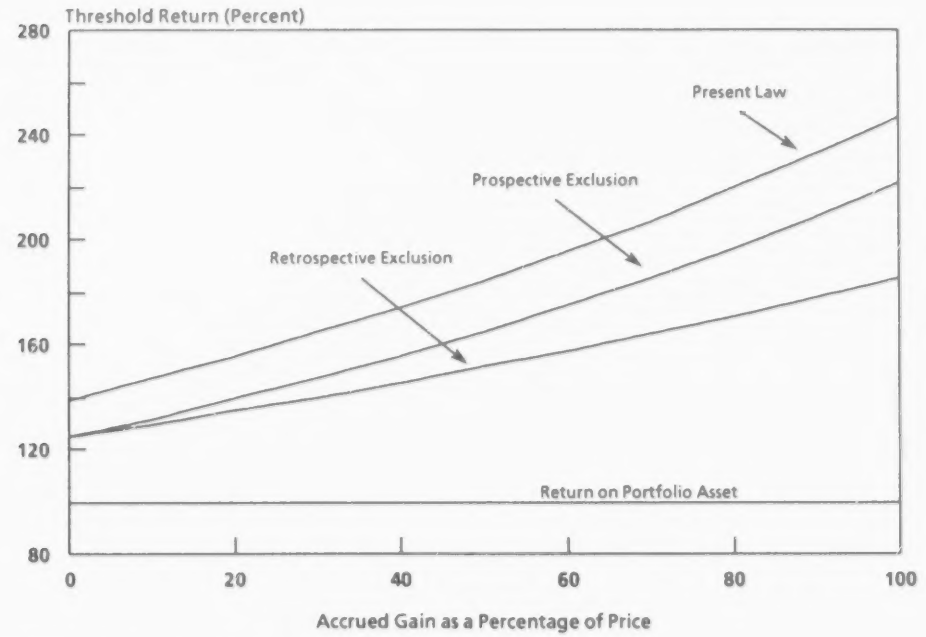
SOURCE: Congressional Budget Office.

NOTE: The portfolio asset is assumed to double in value; the marginal tax rate on ordinary income is 28 percent and the exclusion is 30 percent.

would be held until death. In this case, the prospective exclusion has no effect on the threshold return. In contrast, the retrospective exclusion reduces threshold returns by between zero percent and 17 percent, depending on the amount of accrued gain. When the accrued gain is large, however, the threshold return is also large, so that lowering the threshold may provide little additional incentive to sell (see Figure 7).

In the case where the portfolio asset is held until death and the alternative is not, the prospective exclusion reduces the threshold return

Figure 8.
Threshold Return by Accrued Gain Under Retrospective and Prospective Exclusions When the Portfolio Asset Would be Held Until Death



SOURCE: Congressional Budget Office.

NOTE: The portfolio asset is assumed to double in value; the marginal tax rate on ordinary income is 28 percent and the exclusion is 30 percent.

by the same proportion as in the case where neither asset is held until death--10 percent (see Figure 8). The retrospective exclusion, however, provides a much stronger incentive because, in this special case, a relative-return effect takes place as well as an unlocking effect. In the extreme case where the value of the portfolio asset is 100 percent capital gain, the threshold return is reduced by 25 percent: from 247 percent to 185 percent. Whether even such a dramatic reduction is likely to stimulate much sales when the threshold levels are so high, however, is open to question.

Selling to Finance Consumption

If cutting capital gains tax rates is to be an effective saving incentive, then it should not result in an increase in consumption levels. Cutting the tax rate on capital gains is, however, different from cutting the tax rate on interest income, for example, because capital gains are not taxed at death. Because of this feature, taxpayers have a strong incentive to hold assets until death to avoid capital gains taxes, as was demonstrated in the computation of threshold returns. This incentive diminishes as the capital gains tax rate is cut.

This feature of present law affects the cost of making bequests relative to consuming during one's own lifetime. For an asset that is expected to earn a "normal" rate of return, the trade-off between current consumption and bequests is directly related to the tax rate. To illustrate the point with an extremely simple example, consider the choice of a taxpayer in the 28 percent marginal tax bracket who knows with certainty that he or she will die tomorrow. If the taxpayer sells $10,000 worth of stock and realizes $5,000 of gain, he or she can finance a last spurt of consumption equal to $8,600, which is the after-tax proceeds of the stock sale. If the taxpayer holds on to the stock, thereby forgoing $8,600 of consumption, he or she can leave the entire $10,000 in bequests. The cost of current consumption is relatively high--$1.16 of forgone bequest for every $1.00 of consumption (assuming zero estate taxes). The cost of $1.16 is the ratio of the $10,000 bequest to the $8,600 in consumption.

This cost falls with the capital gains tax rate. At a capital gains tax rate of 19.6 percent, the cost would be $1.11. If taxpayers' bequests are sensitive to the cost of bequests then taxpayers will make smaller bequests at the lower tax rate.

In the short run, this effect is only important under a retrospective tax cut, since the prospective tax reduction affects neither the tax cost of selling old assets nor the after-tax return from holding assets until death. However, cutting tax rates retrospectively can significantly affect an individual's choice between consumption and bequests.[2]

INDEXING

Some proposals have called for indexing the tax basis of capital assets for inflation. Using this approach, only the noninflationary component of a capital gain is subject to tax.[3]

If asset returns and inflation are expected to be constant over time, indexing is equivalent to an exclusion that declines slightly over time. For example, if inflation is expected to be 4 percent and the expected nominal return is 8 percent, then indexing would be equivalent to a 50 percent exclusion for an asset that is held one year because inflation would be half of the total return. If the same asset is held 10 years, then the equivalent exclusion would be 41 percent. For example, if $1.00 were invested at 8 percent, it would be worth $2.16 after 10 years. However, the value of the $1.00 investment would be inflated to $1.48. Thus, under indexation, $0.48 of the nominal gain of $1.16, or 41.4 percent, would be excluded from taxable income. These differences aside, either indexation or an exclusion would raise the after-tax return on a new investment.

As embodied in most Congressional proposals, however, retrospective indexing would differ from a retrospective exclusion in important respects. Under retrospective indexing, the basis for an old asset (one

2. See Holt and Shelton, "The Lock-In Effect of the Capital Gains Tax," which showed that the lock-in effect associated with bequests increases with age.

3. See Congressional Budget Office, *Indexing Capital Gains* (August 1990).

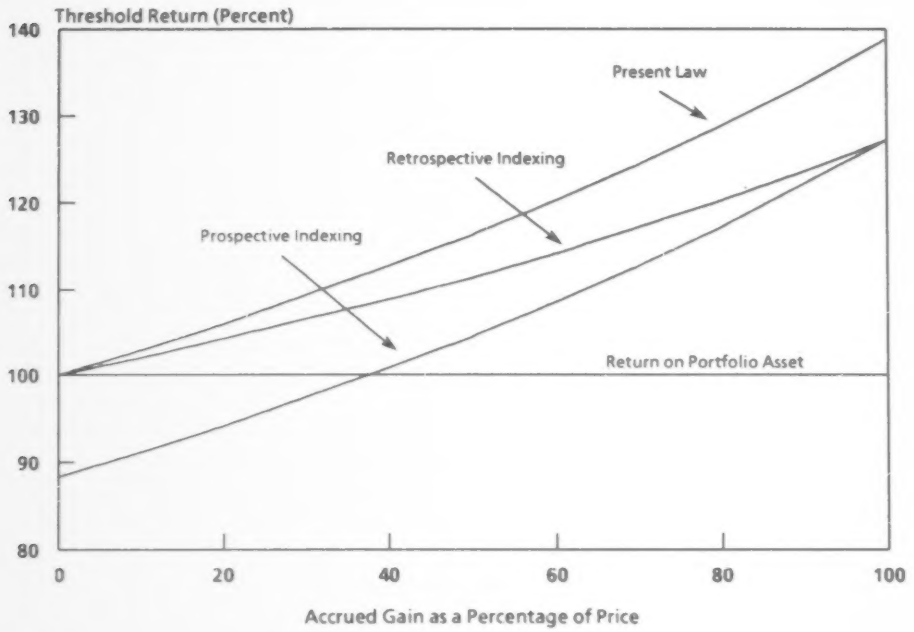
purchased before some effective date specified in the enacting legislation) would be indexed for inflation occurring after the effective date. Thus, there is no offset for past inflation. As a result, retrospective indexing in the short run would not affect the tax cost of selling the asset (the lock-in effect). Because both old and new assets are indexed for future inflation, the relative-return effect would also be diminished.

The incentive to sell assets under retrospective indexing increases as the accrued gain increases because the relative-return effect increases with the amount of gain. In the extreme case where gain equals 100 percent of the price of the portfolio asset, retrospective indexing provides no benefit to the portfolio asset because the asset has no basis. In this case, retrospective indexing is equivalent to prospective indexing. At the other extreme, where the gain is zero, the basis of the portfolio asset is fully indexed. In this case, alternative investments are not tax-favored relative to the portfolio asset. In other words, there is no relative-return effect and no tax incentive to sell the portfolio asset.

For assets with gains between zero and 100 percent, the incentive to sell assets ranges between no incentive and the full incentive from the relative-return effect from prospective indexing. In this respect, retrospective indexing is similar to a retrospective exclusion that also creates incentives to sell ranging from zero when there is no capital gain to an incentive equivalent to the full relative-return effect when the gain is 100 percent of asset value. The pattern of threshold returns under present law and under both retrospective and prospective indexing are presented in Figure 9 for the case in which future inflation equals 30 percent of the asset's future value upon sale.

Another indexing option would be to index all gains, past and future, for inflation. This option is interesting because, like other indexing options but unlike a retrospective exclusion, fully retrospective indexing produces a relative-return effect as well as an unlocking effect. The relative-return effect occurs because old assets with substantial real gains are only indexed for inflation on the original basis, not the current value. In contrast, the full value of new assets is indexed.

Figure 9.
Threshold Return by Accrued Gain Under Retrospective and Prospective Indexing When Neither Asset Would be Held Until Death



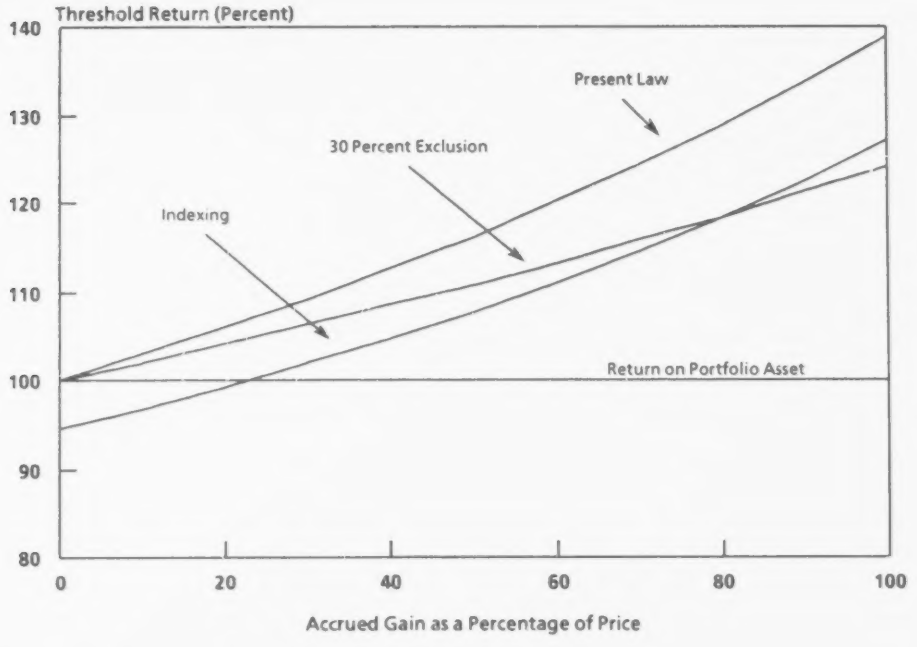
SOURCE: Congressional Budget Office.

NOTE: The portfolio asset is assumed to double in value; the marginal tax rate on ordinary income is 28 percent and the exclusion is 30 percent.

For example, in the extreme case of an asset with zero basis, retrospective indexing would do nothing. But if the asset is sold and a new one purchased with the after-tax proceeds, the new purchase amount is fully indexed against future inflation. (See Appendix B for a more precise explanation of this point.)

Fully retrospective indexing also produces a substantial unlocking effect. In combination with the relative-return effect, this indexing option can produce a much larger incentive to sell than under a retrospective exclusion of similar average magnitude. (See Figure 10.)

Figure 10.
Threshold Return Under Fully Retrospective Indexing Versus Retrospective Exclusion



SOURCE: Congressional Budget Office.

NOTE: The portfolio asset is assumed to double in value; past inflation is 30 percent of basis, and future inflation is 30 percent of the current price; the exclusion is 30 percent.

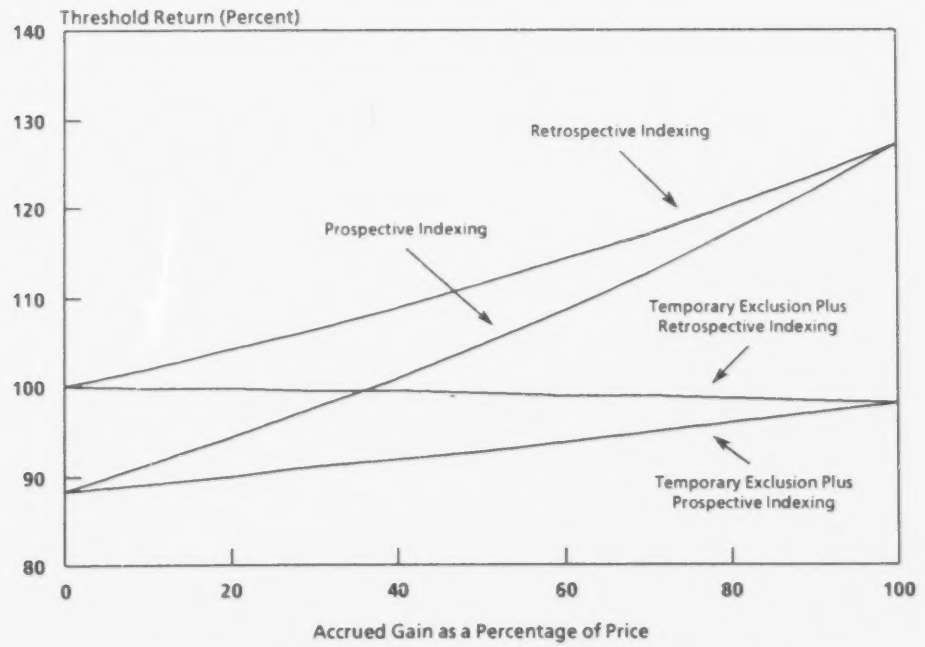
TEMPORARY EXCLUSION FOLLOWED BY PROSPECTIVE INDEXING

Temporary exclusions of capital gains, such as those by the House Ways and Means Committee proposed in 1989, can provide strong incentives for taxpayers to realize capital gains. The common feature of such proposals was to provide a preferential capital gains tax rate for a short period (for example, two years) followed by either prospective or retrospective indexing. These proposals provide an additional incentive to sell compared with prospective or retrospective indexing be-

cause they create a temporary unlocking effect. Moreover, since this unlocking effect is temporary, it also adds to the relative-return effect that is the incentive for selling under either indexing option.

When a temporary exclusion of 30 percent is combined with either prospective or retrospective indexing, the temporary exclusion lowers the threshold returns, roughly proportionately, for each type of subsequent indexing option (see Figure 11). For example, where the port-

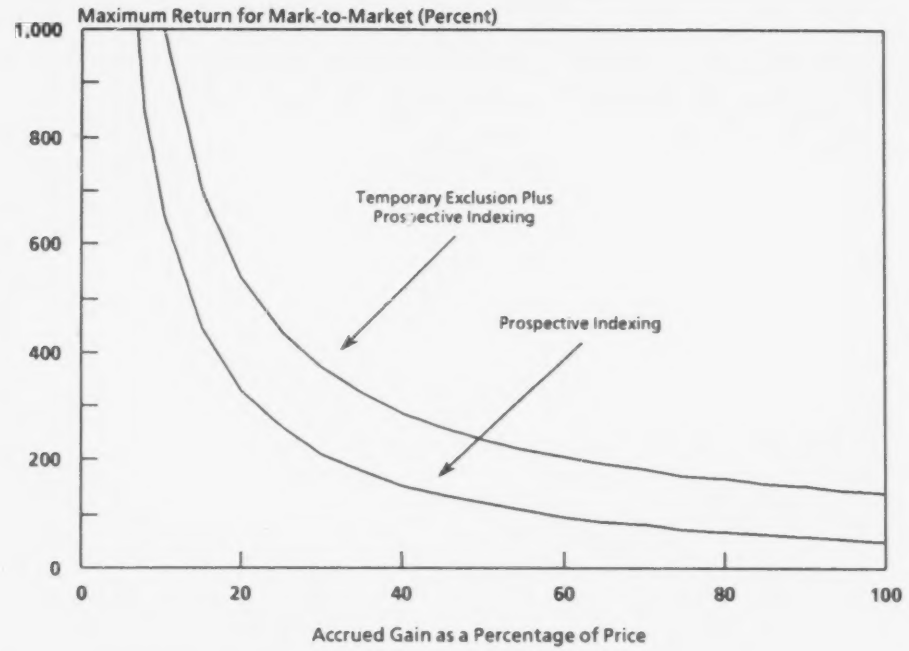
Figure 11.
Threshold Return by Accrued Gain Under Retrospective and Prospective Indexing With and Without a Temporary Exclusion



SOURCE: Congressional Budget Office.

NOTE: The portfolio asset is assumed to double in value; past inflation is 30 percent of basis, and future inflation is 30 percent of the current price; the exclusion is 30 percent.

Figure 12.
Maximum Expected Return on Portfolio Asset at Which Mark-to-Market is Profitable to Taxpayer



SOURCE: Congressional Budget Office.

NOTE: The portfolio asset is assumed to double in value; past inflation is 30 percent of basis, and future inflation is 30 percent of the current price; the exclusion is 30 percent.

folio asset is expected to double in value over the planned holding period, either temporary exclusion would cause the taxpayer to want to realize a capital gain, even if no other asset would pay a higher pretax rate of return. However, the incentive is weaker when a retrospective rather than a prospective exclusion follows the temporary tax cut.

The Incentive to Mark to Market

What kind of assets would taxpayers want to mark to market--a transaction equivalent for tax purposes to selling and repurchasing the

same asset--under either a temporary exclusion followed by prospective indexing, or prospective indexing alone? The main conclusion is that a taxpayer can increase his or her ultimate after-tax wealth by marking to market if accrued capital gains are small or if the expected future return is small. The taxpayer has to choose between the value of deferring tax on the accrued gain and the value of realizing a gain and paying tax in exchange for indexing the basis of the asset. In the extreme case where the asset had no accrued gain--so the cost of marking to market is zero--the taxpayer would elect to mark to market regardless of the anticipated future gain (see Figure 12 on page 33).

Marking to market would never be profitable under retrospective indexing. In this case, the value of deferral is always greater than the benefit of getting a larger basis for indexing when the tax burden of immediate capital gains is properly accounted for.

The incentive to mark to market is stronger under the temporary exclusion than under prospective indexing alone. Yet, even when prospective indexing is not combined with a temporary exclusion, a wide range (the area under the curve in Figure 12) exists where marking to market would be profitable.

VARIABLE EXCLUSIONS

Several capital gains proposals call for a variable exclusion that would increase with the holding period. The objective of these schemes is to encourage long-term holding.

A variable exclusion has effects on the incentive to sell that are similar to those of a fixed exclusion. As long as the holding periods for different assets being evaluated are the same, the computation of threshold return and the qualitative conclusions of the above analysis remain the same. However, if assets with different holding periods are compared, the appropriate effective tax rates will be different. In this case, conclusions about the effect on threshold returns of a variable exclusion will depend on the holding period of both the portfolio and alternative assets as well as on the accrued capital gain in the portfolio asset.

Depending on how a sliding scale exclusion is phased in, there could be less short-term selling than under a fixed exclusion. The Administration's proposal in the 1990 budget phased in the sliding scale gradually, initially granting the maximum exclusion for all assets held beyond the minimum holding period (one year) and increasing the holding requirement year by year. Under this plan, the short-run response would be the same as for a flat exclusion with a requirement for a one-year holding period.

However, if the full variable exclusion were to take effect immediately, sales of assets that had been held for less than the holding period for the maximum exclusion might be depressed. For example, if one-year assets qualified for a 10 percent exclusion, whereas three-year assets qualified for a 30 percent exclusion (as under the Administration's proposal), taxpayers would have an incentive to hold one-year assets to qualify for the larger exclusion, especially assets with a large accrued gain. In the extreme case where a portfolio asset that had been held for one year had a 100 percent gain, holding for two more years to qualify for the higher exclusion earns the equivalent of a 3.7 percent after-tax annual return before accounting for any asset appreciation. Obviously, there is a large incentive to hold the asset to qualify for the maximum exclusion, which of course, is the intent of the variable exclusion. Nonetheless, assets that had been held for only a year are unlikely to have a large percentage gain. Thus, this kind of lock-in may not be quantitatively very significant.

AN ALTERNATIVE MAXIMUM TAX RATE

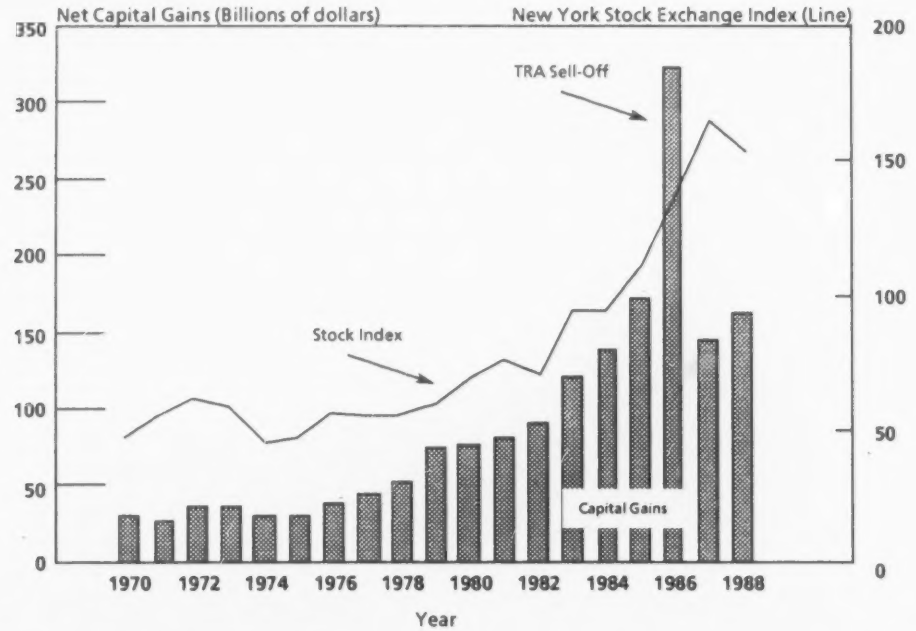
A more direct way to cap the effective tax rate on capital gains is through an explicit alternative maximum tax rate. An alternative maximum tax rate of 28 percent is in effect under present law, although the effective tax rate on capital gains can still exceed the 29 percent maximum because of certain phase-outs. Some possible advantages of an alternative maximum rate as compared with an exclusion are that the effective tax rate on capital gains would not depend on the tax rate on other income for high income taxpayers and that the benefits would be targeted at the group of taxpayers who are thought to respond most to tax rates.

An alternative maximum tax rate would have analytically similar effects on the incentive to sell assets as an exclusion that varied with a taxpayer's marginal tax rate on ordinary income. For example, an alternative maximum tax rate of 15 percent would be identical to an exclusion of 46 percent for taxpayers in the 28-percent tax bracket, 52 percent for taxpayers in the 31-percent bracket, and zero for everyone else.

EVIDENCE FROM THE TAX REFORM ACT OF 1986

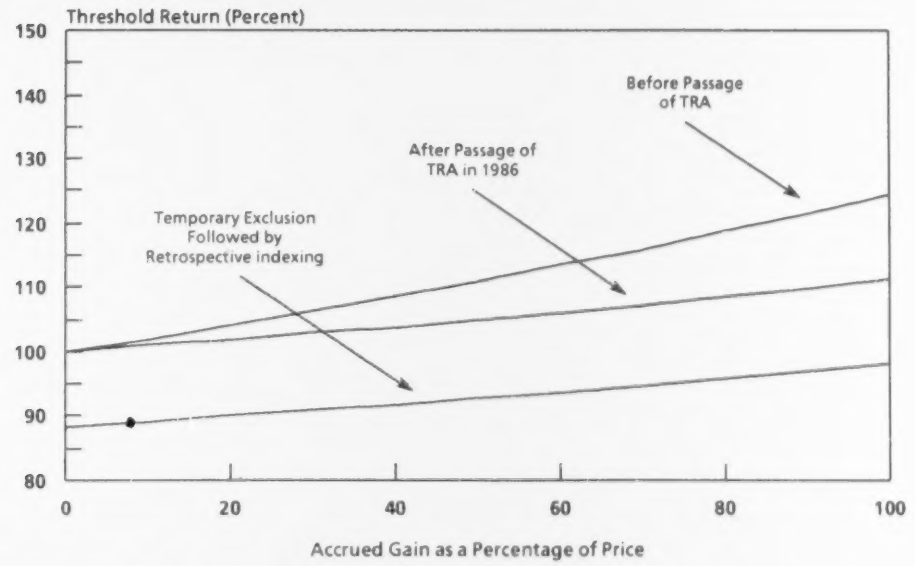
Little empirical evidence exists on the short-run effects of capital gains tax cuts. One important exception is the experience of the Tax Reform

Figure 13.
Net Positive Capital Gains Compared With the New York Stock Exchange Index



SOURCE: Congressional Budget Office.
NOTE: TRA = Tax Reform Act of 1986.

Figure 14.
Threshold Return by Accrued Gain Under Temporary Exclusion Plus Retrospective Indexing Compared With the Incentive to Sell in 1986



SOURCE: Congressional Budget Office.

NOTE: The portfolio asset is assumed to double in value; past inflation is 30 percent of the current price; the before- and after-TRA lines assume a 20 percent capital gains tax rate; the temporary exclusion is 30 percent; the corresponding tax rate on ordinary income is 28 percent.

TRA = Tax Reform Act of 1986.

Act of 1986 (TRA), which showed that taxpayers can respond dramatically and unambiguously to short-run tax incentives to sell assets.

TRA raised the maximum effective tax rate on capital gains from 20 percent to 28 percent beginning in 1987. (The maximum rate increased again to 33 percent in 1988.) Because TRA was passed in August of 1986, taxpayers had several months to realize capital gains at the lower rates before the tax increase took effect. As Figure 13 shows, capital gains realizations nearly doubled in 1986. While part of this increase stemmed from the surge in the stock market through the year, much of the increase must have been a response of taxpayers to

the temporarily low tax rates on capital gains. The TRA "sell-off" in 1986 provides information about how taxpayers respond to temporary tax cuts.

TRA created the same kind of short-run incentives to sell assets as a temporary exclusion followed by prospective indexing. The magnitude of the incentive, however, was actually smaller in 1986 than it would be under a temporary exclusion followed by indexing. The TRA experience suggests a temporary cut in capital gains tax rates could induce a great deal of asset sales in the short run. Figure 14 on the preceding page shows threshold returns for a taxpayer facing a 20 percent tax rate in 1986 who expected his or her tax rate to increase to 28 percent in 1987. For comparison, the figure also shows threshold returns for the temporary 30 percent exclusion followed by prospective indexing.

CHAPTER III

REVENUE IMPLICATIONS

Given the current budget straightjacket the Congress faces, a prospective capital gains tax cut would seem attractive as compared with a retrospective cut. A prospective tax cut would probably lose much less revenue in the short run--it might even raise revenue over several years--and would provide identical incentives to investors over the long run.

There are two reasons for the short-term revenue advantage. First, as explained above, a prospective tax cut would provide a similar incentive to sell as would a retrospective tax cut. Second, virtually all short-run realizations of capital gains would be fully taxed under a prospective tax cut, whereas they would be subject to lower tax rates under a retrospective tax cut.

So, how much cheaper is a prospective tax cut? Unfortunately, nobody knows. Past experience applies exclusively to retrospective tax changes, and there is no direct information about the magnitudes of the key variables in the analysis developed earlier. In addition, since a prospective tax cut is essentially a government promise to cut taxes in the future, the incentive depends heavily on whether investors believe that promise. This section explains how the main capital gains policy options compare with each other in terms of short- and long-run revenues, using a necessarily qualitative yardstick.

COMPARATIVE EFFECTS OF DIFFERENT OPTIONS

Since a retrospective exclusion provides an immediate tax cut on all capital gains, whereas a prospective tax cut does not, the revenue effects of the two alternatives could be significantly different. If retrospective and prospective exclusions induce similar amounts of realizations, though for different reasons, a prospective exclusion is much

more likely to raise revenue in the short run than a retrospective exclusion. This outcome is not unlikely in light of the threshold returns computed above.

As an example of the comparative revenue effects, suppose that realizations under current law would be $200 billion in 1991 and that the average tax rate on capital gains is 25 percent. Then capital gains revenue under present law is $50 billion. Suppose that either a retrospective or a prospective 30-percent exclusion would result in short-run incentives to sell portfolio assets that would prompt taxpayers to realize an additional $50 billion of gains. The retrospective exclusion results in revenues of $43.75 billion ($250 billion times 17.5 percent or a net revenue loss of $6.25 billion). In contrast, the prospective exclusion yields revenues of $62.5 billion, a net gain of $12.5 billion, since all of the additional realizations are taxed at the 25-percent rate.

Retrospective indexing would be unlikely to lose revenue in the short run because it does not provide an immediate tax reduction on old assets. Retrospective indexing only provides indexing for future inflation and so does not immediately change effective tax rates. However, retrospective indexing would not stimulate as much realization as prospective indexing because the threshold returns are uniformly higher under retrospective indexing. For example, rational taxpayers would not elect to mark to market old assets under retrospective indexing whereas under prospective indexing a considerable amount of marking to market could take place. Thus, prospective indexing would raise more revenue in the short run than retrospective indexing.[1]

If the objective is to raise revenue in the short term, then a temporary exclusion followed by a prospective tax cut (either indexing or exclusion) may be the most effective tool. As Figure 14 showed, a temporary exclusion followed by prospective indexing provides a much stronger incentive for investors to sell assets than prevailed during the TRA sell-off in 1986. However, note that, because the temporary exclusion reduces tax rates on the realized capital gains, it is not at all certain that such a plan would raise more revenue than a prospective tax cut.

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1. See Congressional Budget Office, *Indexing Capital Gains* (August 1990).

In the cases discussed above, any short-run revenue gain would accelerate future tax payments except when the assets that are sold would have been held until death. In the case of a retrospective exclusion or a temporary tax cut, the acceleration is on unfavorable terms to the government because taxpayers pay a lower tax rate on the gains that they realize than they would ultimately have paid under present law. This effect may be a reason to favor prospective exclusions or indexing over the other alternatives. At the same time, a retrospective exclusion is more likely to induce realization of gains on assets that would otherwise be held at death.

DIFFICULTY IN MAKING QUANTITATIVE PREDICTIONS

Economists are uncertain about how realizations respond to changes in the capital gains taxes in the short run. Most of the econometric evidence on the response of realizations to changes in the tax rate on capital gains pertains to long-run responses, and even this evidence is controversial because the results vary greatly depending on whether the data are from cross-section or time-series.[2]

The Uncertain Econometric Evidence

Several econometric studies have attempted to estimate the short-run response of capital gains to tax-rate changes.[3] The 1988 CBO analysis of time-series data found no significant difference between short-run and long-run responses.[4] Cross-section studies found significant differences between short-run and long-run response, but it is unclear whether the cross-section estimates are relevant to policy analysis.

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2. See, for example, Gerald E. Auten, Leonard E. Burman, and William C. Randolph, "Estimation and Interpretation of Capital Gains Realization Behavior: Evidence From Panel Data," *National Tax Journal*, vol. 42, no. 3 (September 1989).

3. Donald W. Kiefer, "Lock-In Effect Within a Simple Model of Corporate Stock Trading," *National Tax Journal*, vol. 43, no. 1 (March 1990) argues that these estimates more likely capture an "intermediate-run" effect.

4. Congressional Budget Office, *How Capital Gains Tax Rates Affect Revenues: The Historical Evidence* (March 1988).

Nonetheless, revenue estimators seem to agree, perhaps based implicitly on the type of analysis presented in this paper, that the short-run response of taxpayers to changes in the capital gains tax is greater than the long-run response. This assumption is reflected in a higher short-run elasticity of response.[5]

Relevance of Elasticities to Prospective Tax Changes

It is not simple to apply the evidence, however uncertain, to a prospective tax rate change. One possible approach is to convert a fixed prospective tax rate--at 19.6 percent, for example--into equivalent retrospective tax rates for the case where no asset would be held until death. "Equivalence" means that the required return on the alternative investment would be the same under the retrospective rate as under the 19.6 percent prospective rate. In general, the equivalent retrospective rate is lower than 19.6 percent. The equivalent retrospective tax rate increases as the accrued capital gain for the portfolio asset increases; as the amount of accumulated gain increases, the importance of lock-in also increases. At a gain of 100 percent, the equivalent retrospective tax rate equals the prospective tax rate. At the other extreme, when the accrued gain approaches zero, there is little unlocking effect under a retrospective exclusion, whereas the relative-return effect under a prospective exclusion is large. As a result, no retrospective tax rate provides the same incentive to sell as under a prospective exclusion of 30 percent (see Figure 15).

These calculations illustrate the difficulty of simply extrapolating an elasticity of response estimated from past retroactive tax changes to a prospective tax cut. To do so, one would need to know the distribution of accrued gains in taxpayers' portfolios as well as their expectations about future returns and the accrued gains on assets that are planned to be held until death. These data are not available.

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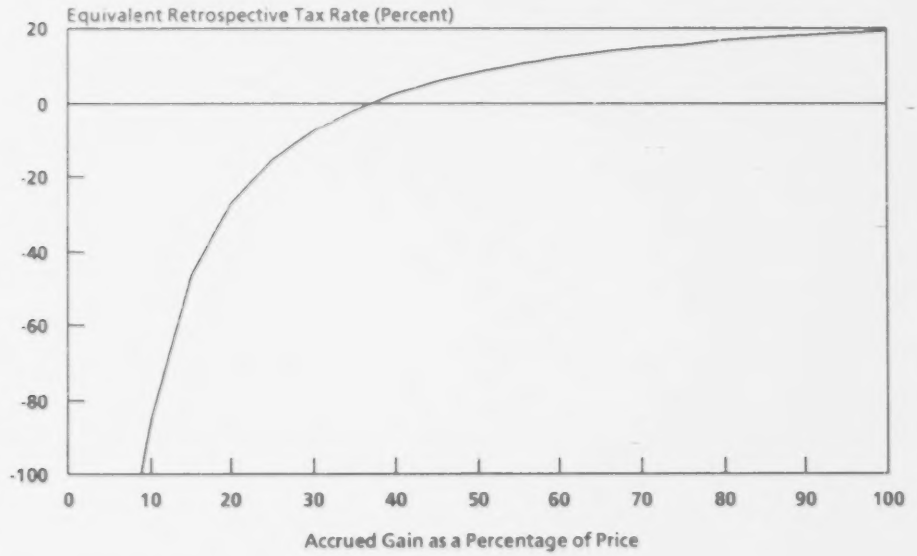
5. See, for example, Kiefer, "Lock-In Effect within a Simple Model of Corporate Stock Trading," for a careful exposition of this point.

Problems in Estimating the Response to Indexing Proposals

From an economic perspective, although indexing affects incentives to sell in a different way from an exclusion, both indexing and an exclusion lower effective tax rates on capital gains. Revenue issues related to indexing are discussed in more detail in the Congressional Budget Office report, *Indexing Capital Gains* (1990). The analysis of threshold returns showed that the distribution of threshold returns under indexing would be similar to the threshold returns resulting from an exclusion if the exclusion is roughly equivalent to the ratio of inflation to expected nominal gains.

Figure 15.
Retrospective Tax Rate Equivalent to 19.6 Percent Prospective Tax Rate When Assets Would Not be Held Until Death



SOURCE: Congressional Budget Office.

Taxpayers may perceive indexing, however, as a radical departure from past tax laws. Having no historical experience with indexing, taxpayers may thus not behave "rationally" in response to indexing. For example, taxpayers may take several years to learn about and adjust to the new law, which implies that any short-run revenue gains would be spread out over several years.

Would Taxpayers Believe That a Tax Change is Permanent?

Capital gains tax rates have changed three times since 1978, and future changes have been speculated about ever since the passage of TRA. One problem in estimating the effect of a cut in capital gains tax is that some taxpayers may have been deferring realizations in the hopes of getting a lower tax rate if they wait. Part of the surge in realizations that may occur if rates are cut may actually represent a cashing in of deferred realizations. Presumably, those realizations could also be induced by a credible pledge not to change the capital gains tax rate. The analysis of threshold returns assumes that taxpayers believe that any new law would be permanent--or at least would last as long as the taxpayer planned to hold the asset in question. If taxpayers do not believe that a change in the capital gains tax will be permanent, the short-run response may be much different. In particular, for taxpayers to sell portfolio assets and purchase new ones to take advantage of the higher after-tax rate of return, they must believe that a prospective tax cut would remain in place. For taxpayers to rush to take advantage of a temporary tax cut, they must believe that the cut is indeed temporary and that the promised tax treatment that follows would actually take effect.

Suppose, for example, that taxpayers believed that the capital gains proposal, passed in the House of Representatives in 1989, which called for a temporary exclusion followed by prospective indexing, would in fact be replaced by a permanent exclusion before the end of the "temporary" period. In that case, the short-run response would be more like the modest response to be expected from a permanent exclusion, rather than the larger response expected from a temporary tax cut. Even if taxpayers were uncertain about the future shape of tax law, they might defer as many capital gains as possible to the end of

the "temporary" period to get better information about whether the cut would be truly temporary. First-year realizations in response to such an uncertain tax law change could therefore be much smaller than would otherwise be expected.

CHAPTER IV

TAX-INDUCED SALES AND EFFICIENCY

Apart from effects on revenue, sales of capital assets in response to tax changes on capital gains have both positive and negative effects on economic efficiency. The primary positive effect is that the resulting allocation of capital is more in line with the allocation that would occur in the absence of distorting taxes. The principal negative effect is that sales of assets purely for tax purposes have real transaction costs and are inefficient. Allowing taxpayers the option of marking assets to market can mitigate this source of inefficiency.

UNLOCKING OLD ASSETS

All of the options discussed above provide incentives for taxpayers to sell old assets and purchase new ones. The retrospective exclusion does so by lowering the cost of selling old assets. The prospective exclusion and indexing do so by raising the after-tax rate of return on alternative assets. Temporary tax cuts work through both mechanisms.

Such trading can improve market efficiency and raise social welfare. Efficiency will improve if individual trading is "rational"--in other words, if individuals trade to balance their portfolios to reduce risk or to finance consumption or because they have information about prices that causes them to sell. In the first two cases, the gain in efficiency comes from an increase in individual welfare. In the last case, trading based on information moves prices in line with true underlying values.

However, some analysts have questioned whether individual trading is based on information (knowledge about future prospects for assets) or noise (ignorant speculation). If individuals are primarily noise

traders, then market efficiency is not enhanced by trading.[1] In addition, there is some evidence that investors may overreact to short-term information such as firms' reports of earnings and profits while discounting the long-term prospects of firms.[2] Trading based on "short-termism" may cause asset prices to systematically deviate from the inherent value of firms. Noise trading can increase the variability of market prices and make it harder for expert traders and arbitragers to extract information about the true value of investments. Moreover, such trading carries an additional social cost because of the transaction costs involved in nonoptimal trading.

On balance, the consequence to efficiency of the additional trading induced by changes in capital gains taxes is unlikely to be significant. The evidence on market efficiency is decidedly mixed, but Kiefer's survey concluded that one cannot reject the hypothesis of efficient markets based on available research. On the other side, the benefits to individuals of diversifying their portfolios are unlikely to be great. Individuals with large portfolios who trade often account for a large share of realizations of taxable capital gains. These individuals have considerable control over portfolio risk, even if some of their assets are "locked in" because of capital gains taxes. They can diversify by trading in options, or by purchasing securities whose returns are negatively correlated with the returns of the assets in which they are overinvested. The gain in efficiency to these individuals of unlocking old assets stems not from lower portfolio risk, but rather from the savings of transaction costs that they would otherwise incur in trying to minimize their risk through these alternative means.

COSTS OF CHURNING

Some asset sales prompted by a capital gains tax cut may have little or no economic value aside from their tax benefits. Such purely tax-motivated selling of assets is called churning. Churning of assets has

1. See Fischer Black, "Noise," *Journal of Finance*, vol. 61, no.3 (July 1986).

2. A good survey of the evidence about investor myopia and noise trading is contained in Donald Kiefer, "Stock Market 'Short-Termism:' Implications for Corporate Planning Horizons," Congressional Research Service (May 29, 1991).

been recognized as a drawback of accelerated depreciation deductions, but it could also occur as a result of some of the capital gains options discussed above. The prospective tax cut and the temporary tax cut options could cause an extreme form of churning in which taxpayers would sell an asset to buy back either the same or a very similar asset.

Tax-induced churning unambiguously reduces market efficiency. Allowing taxpayers the option of marking existing assets to market would reduce this inefficiency. A mark-to-market election allows taxpayers who would sell assets purely for tax purposes to achieve the same result without incurring transaction costs. Allowing mark to market produces more revenue for the government, because taxpayers can save the transaction costs of selling and thus are willing to mark some assets to market that they would not have churned because of the transaction costs. In addition, in some markets that are thinly capitalized--for example, regional housing markets--allowing mark to market may prevent severe disruptions.

APPENDIXES

APPENDIX A

COMPUTATION OF THRESHOLD RETURN IN CASE OF PORTFOLIO ASSET HELD UNTIL DEATH

Because assets that are held until death escape capital gains taxation, threshold returns are higher than for assets that would be sold before death. Threshold returns are also more sensitive to tax rates for portfolio assets that would be held until death because the alternative investment would be subject to tax twice, while the portfolio asset is untaxed.

Analytically, the previous example can be adapted to the case of a portfolio asset that would be held until death. The computation is shown in the seventh column of Table 1. Assume the same facts for the hypothetical taxpayer and for the current value and capital gain of the portfolio asset. Assume, however, that the holding period is a lifetime and that the asset is expected to be worth $3,000 at death. Since there is no capital gains tax at death, holding the asset yields $3,000 of after-tax wealth at death (before imposition of estate tax). The alternative investment strategy must yield the same after-tax value at death.

Assume that the alternative asset would be held for a fixed period of time, after which the after-tax proceeds from the sale would be invested in a second asset that would increase in after-tax value by 50 percent between the purchase date and death. It is assumed that this later investment is not affected by capital gains taxes. Notice that this assumption does not rule out the possibility that the second asset might be a capital gains asset held until death because capital gains are not subject to tax at death. These assumptions are equivalent to assuming that the discount rate between the sale date of the alternative investment and the date of death is 50 percent.

Based on these assumptions, the required return on the alternative asset--the threshold return--can be inferred. Working backwards, for the second asset to yield $3,000 at death, the amount invested

must be $2,000 ($2,000 that appreciates by 50 percent yields $3,000). As in the previous case, if the portfolio asset is sold, it would yield $860 after the capital gains tax. This $860 has to increase in after-tax value to $2,000. At a tax rate of 28 percent, the pretax value of the alternative investment must grow to $2,443. The capital gain is $1,583 ($2,443 minus $860), and the tax is $443.

The threshold return for the alternative investment is 184 percent ($1,583 over $860). By comparison, the $3,000 yielded on the asset held until death is equal to $2,000 in present value at the end of the holding period for the alternative investment.

Figure 3 shows threshold returns for alternative investments that would not be held until death when the portfolio asset would be held until death. They are uniformly higher than in the case of a shorter holding period. The figure shows that, unlike the previous case, the threshold return exceeds the threshold return for the portfolio asset even if there is no accumulated capital gain. This effect takes place because the portfolio asset still benefits from nontaxation at death on future gains whereas the alternative investment would be taxed on sale.

APPENDIX B

ALGEBRAIC DERIVATION OF THRESHOLD RETURNS

This appendix defines algebraically the general relationships between a capital gains tax regime and the returns required to induce realizations that are discussed in the text and illustrated in the figures. The examples in Table 1 are special cases of these general findings.

I. Threshold Return for Two Assets With Same Holding Periods

Suppose that an investor is considering whether to sell asset A or hold it for N years.[1] His alternative is to purchase asset B, which would also be held for N years. Suppose that the pretax rate of return on A is r_0 and the pretax return on B is r. In this simple case, the investor would choose the strategy that yielded him or her the greater amount of after-tax wealth after N years.

After-tax terminal wealth per dollar of A may be represented as follows. If the investor holds A,

$$W_h = b + g(1-\tau_h) + r_0(1-\tau_h) , \qquad (1)$$

where W_h is terminal wealth, b is the cost basis of the asset as a fraction of current price, g is the accumulated gain of the asset as a fraction of current price, and r_0 is the anticipated future gain.[2] Both the accumulated gain, g, and expected future returns, r_0, will be taxed at rate τ_h.

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1. The assumption of equal holding periods is made for convenience only. The qualitative results would be the same if different holding periods were allowed, but the algebra would be complicated. See the case where one asset is held until death for a model of unequal holding periods.

2. Note that b+g=1.

If the investor sells A and purchases B, terminal wealth is

$$W_s = b + g(1-\tau_0) + r(1-\tau_s)(1-\tau_0 g). \quad (2)$$

In this case, accumulated gains are currently taxed at rate τ_0. The after-tax proceeds of the sale, $(1-\tau_0 g)$, are reinvested, earning rate of return r, which is taxed at rate τ_s.

A. Neither Asset Held Until Death

1. Present Law (Full Taxation of Nominal Gains)

For an investor to be willing to sell A, W_s must be at least as great as W_h. Under present law, where $\tau_h = \tau_0 = \tau_s = \tau$, this axiom implies that the minimum return on the alternative investment--that is, the threshold return--is

$$r = r_0 \times \frac{1}{1-\tau g}, \quad (3)$$

which is found by equating W_s to W_h and solving for r. Note that the first two components of (1) and (2) cancel out. This occurs under most proposed changes in capital gains tax law.

Expression (3) simply states that the rate of return on an alternative investment must be at least enough larger than the rate of return on the portfolio investment to offset the tax cost of selling now (τg). This axiom is the "lock-in" effect.

2. Effect of a Capital Gains Tax Cut

Suppose that the rate of tax on capital gains is reduced to τ' for qualifying assets. Under a retrospective tax change, $\tau_h = \tau_0 = \tau_s = \tau'$. Under a prospective tax change, the lower rate would only apply on newly purchased assets. Thus, $\tau_s = \tau'$, but $\tau_h = \tau_0 = \tau$. Equating W_s to W_h to find the threshold r implies the following expression:

$$r(1-\tau_s)(1-\tau_0 g) = r_0(1-\tau_h) \ . \tag{4}$$

The expression is relatively simple because $\tau_h = \tau_0$ under either kind of tax change. Expression (4) may be solved for r as follows:

$$r = r_0 \times \frac{1-\tau_h}{1-\tau_s} \times \frac{1}{1-\tau_0 g}. \tag{5}$$

The first ratio in (5) is the effect of the capital gains tax on the return to holding relative to the return on a newly purchased asset, which is called the relative-return effect (RRE).

$$RRE = \frac{1 - \tau_h}{1 - \tau_s} \qquad \textit{(relative-return effect)}.$$

The second ratio is the tax penalty from selling now, which is the lock-in effect.

$$LIE = \frac{1}{1 - \tau_0 g} \qquad \textit{(lock-in effect)} \ .$$

Thus, the effect of any capital gains tax on the threshold return on an alternative asset (B) relative to a portfolio asset (A) may be represented as the product of these two effects, as follows:

$$\textit{Threshold Return} = RRE \times LIE \ .$$

Retrospective and prospective tax cuts induce realizations in different ways. The retrospective tax reduction has no effect on RRE (because $\tau_h = \tau_s$), but lowers LIE relative to present law. The prospective change leaves LIE unchanged, but reduces RRE (raises the after-tax return on all new investments) relative to present law.

a. Retrospective tax reduction

The threshold return on B under a retrospective tax reduction, from equation (5), is:

$$r = r_0 \times \frac{1}{1 - \tau' g} .$$

As a fraction of the threshold return under present law (equation 3), the return is:

$$R = \frac{1 - \tau g}{1 - \tau' g} .$$

In other words, a retrospective tax reduction encourages realizations to the extent that it reduces lock-in.

b. Prospective tax reduction

The threshold return on B under a prospective tax reduction is:

$$r = r_0 \times \frac{1 - \tau}{1 - \tau'} \times \frac{1}{1 - \tau g} .$$

As a fraction of the threshold return under present law, the return is:

$$R = \frac{1 - \tau}{1 - \tau'} ,$$

which does not depend on the amount of accrued capital gain. A prospective tax reduction encourages realizations by raising the after-tax rate of return on new investments (reduces RRE).

B. Threshold Return When Both Assets Would be Held Until Death

If A and B would be held until death, then, under any tax regime, $\tau_h = \tau_s = 0$ because of the step-up in basis for capital assets held until death. The only tax cost is the cost of selling A now to purchase B, which is $1 - \tau_0 g$. Recalling that $b+g=1$, equation (1) simplifies to the following:

$$W_h = 1 + r_0 ,$$

that is, there is no capital gains tax if asset A is held until death.

Equation (2) is similarly simplified:

$$W_s = (1+r)(1-\tau_0 g) ,$$

which means that the after tax proceeds of the current sale earn the rate of return r, tax free. Since, under a prospective tax change, τ_0 would not be changed from present law, the threshold return under a prospective tax change would be identical to the threshold return under present law. However, a retrospective change would reduce the lock-in effect by cutting τ_0. In consequence, the threshold return would fall relative to present law.

1. Present Law

Equating W_h to W_s and solving for r yields the following expression for threshold return:

$$r = \frac{r_0 + \tau g}{1 - \tau g} .$$

2. Retrospective tax change

The threshold return relative to present law for a retrospective tax change is

$$R = \frac{r_0 + \tau' g}{r_0 + \tau g} \times \frac{1 - \tau g}{1 - \tau' g} .$$

3. Prospective tax change

The threshold return under a prospective tax change is identical to that under present law.

II. Threshold Return When One Asset Would be Held Until Death

In the case where either A or B, but not both, would be held until death, the analysis is similar. However, since holding periods are different for assets A and B, terminal wealth has to be expressed in terms of present values. The individual is assumed to be interested in maximizing the present value of terminal wealth.

A. Asset A Held Until Death

Consider the choice between holding asset A until death or selling A and purchasing B, which would be held for N years. In this case, $\tau_h=0$, so the return to A is simply the pretax return, r_0.

To make the returns to A and B comparable, it is assumed that the proceeds from the sale of B are reinvested in an asset (or a series of assets), C, that yields an after-tax rate of return, r_1, at death. To keep the problem manageable, this return is assumed not to be sensitive to changes in capital gains tax rates. This means that C is either not a capital gains asset or, if it is, it is held until death (so the capital gains tax rate is zero in any case).

Then terminal wealth at death (that is, bequest) is

$$W_h = 1 + r_0 ,$$

if A is held. If A is sold, wealth at death is

$$W_s = \left[b + g(1-\tau_0) + r(1-\tau_s)(1-\tau_0 g)\right](1+r_1) .$$

Equating W_s and W_h yields:

$$\frac{1+r_0}{1+r_1} = (1 - g\tau_0)\left[1+r(1-\tau_s)\right] . \qquad (6)$$

It is convenient to define the left-hand side of (6) in terms of a discounted rate of return, ρ_0. Let $1+\rho_0$ equal the left-hand side of (6), so

$$\rho_0 = \frac{1+r_0}{1+r_1} - 1 . \qquad (7)$$

In words, ρ_0 is the return on A, r_0, discounted to the holding period for asset B using the return on C as the discount rate. Using ρ_0 in place of r_0, the returns on A and B are expressed in comparable terms.

1. Present Law

From (6) and (7), the threshold return, r, is the following:

$$r = \frac{\rho_0 + g\tau_0}{(1-g\tau_0)(1-\tau_s)} .$$

2. Retrospective tax change

$$R = \frac{1-\tau}{1-\tau'} \times \frac{\rho_0 + \tau' g}{\rho_0 + \tau g} \times \frac{1-\tau g}{1-\tau' g} .$$

3. Prospective tax change

$$R = \frac{1-\tau}{1-\tau'} .$$

Note that in the prospective case, the relative threshold return is the same as when neither asset would be held until death.

B. Asset B Held Until Death

In this case, $\tau_s = 0$. It is apparent that a prospective tax change would have no effect on the return to B, so that it would have to be the same as under present law. A retrospective tax reduction , however, actually discourages this kind of realization relative to present law.

To see this, assume that the proceeds from the sale of A are invested in asset C, which returns r_1 at death and does not depend on capital gains tax rates (as in the previous case). If the portfolio asset is held, terminal wealth at death is

$$W_h = \left[1 - \tau_h g + r_0(1-\tau_h)\right](1 + r_1) .$$

If, instead, the alternative asset is purchased and held until death, terminal wealth is

$$W_s = (1+r)(1-\tau_0 g) .$$

1. Present Law

Under present law, $\tau_h = \tau_0 = \tau$. Equating W_s and W_h, r is found to be

$$r = r_1 + r_0(1 + r_1)\frac{1 - \tau}{1 - \tau g}.$$

2. Retrospective Tax Reduction

Under a retrospective tax cut, τ would be replaced by τ' in the above expression. Notice that the expression is a declining function of τ if g is less than one. This means that the threshold return increases as the tax rate decreases, which is a surprising result. This result occurs because the relative advantage of holding an asset until death diminishes at lower tax rates. Thus, there is a relative-return effect under a retrospective tax cut, and it is opposite to the effect in every other case.

The relative threshold return is as follows:

$$R = \frac{r_1(1 - \tau' g) + r_0(1 + r_1)(1 - \tau')}{r_1(1 - \tau g) + r_0(1 + r_1)(1 - \tau)} \times \frac{1 - \tau g}{1 - \tau' g} .$$

3. Prospective Tax Reduction

As when both assets would be held until death, the threshold return is unchanged by a prospective tax change relative to present law because the newly purchased asset is never taxed. However, in this case, the prospective tax change would result in more realizations than the retrospective tax cut.

III. Alternative Options for Cutting Capital Gains Taxes

A. Indexing

Capital gains indexing proposals can be modeled similarly to a preferential tax rate. Capital gains indexing would not change the qualitative results derived for the case of preferential tax rate, although the algebra is not quite as tidy. The similarity between indexing and a preferential rate is illustrated for the case where neither A nor B is held until death.

Indexing would allow an adjustment to the basis of qualifying assets to account for inflation. Prospective indexing would only apply to newly purchased assets. There are two variations of retrospective indexing. The more common one would index the basis of all assets for future inflation, regardless of when an asset was purchased. This is not quite analogous to the retrospective capital gains tax reduction described above because it only applies to future inflation, whereas a retrospective tax reduction would

apply equally to old and new capital gains. However, it is similar in the sense that an asset generally qualifies for indexing regardless of when it was purchased. The more direct analog is fully retrospective indexing, which indexes the basis of qualifying assets for all inflation between purchase and sale date, regardless when an asset had been purchased.

1. Prospective Indexing

Prospective indexing would only affect terminal wealth if asset A were sold and replaced with asset B. Terminal wealth can be represented in this case as follows:

$$W_s = b + g(1 - \tau) + [r(1 - \tau) + \pi\tau](1 - \tau g),$$

where π is the inflationary component of r. The difference from expression (2) is in the last term, which reflects indexing the basis of B for inflation.

Equating W_s to W_h, from (1), yields this expression:

$$[r(1 - \tau) + \pi\tau](1 - \tau g) = r_0(1 - \tau),$$

which may be solved for r:

$$r = r_0 \frac{1}{1-\tau g} - \frac{\pi\tau}{1-\tau}. \tag{8}$$

The intuition behind this expression is that the threshold rate of return is reduced relative to present law by the tax benefit as a result of indexation, which is $\pi\tau/(1-\tau)$.

The expression for the return relative to present law is complicated and not shown here.

2. Retrospective Indexing

Another approach to indexing is to apply indexing for future inflation to all assets based on their original cost basis. This approach is taken in several recent proposals. Analytically, this would be identical to prospective indexing in the case where A is sold, but would also provide some tax benefit in the case where A is held. Terminal wealth, W_h, would be modified as follows:

$$W_h = b + g(1-\tau) + r_0(1-\tau) + b\pi\tau, \tag{9}$$

Again, only the last part of the expression is different from present law.

The break-even r would satisfy the following expression:

$$[r(1 - \tau) + \pi\tau](1 - \tau g) = r_0(1 - \tau) + b\pi\tau.$$

After some algebraic contortions, this expression reduces to

$$r = r_0 \frac{1}{1 - \tau g} - \frac{\pi\tau g}{1 - \tau g}. \tag{10}$$

This expression is similar to the expression in the prospective case (8), except that τ is replaced by τg in the last component. In other words, the tax benefit depends on the amount of gain in asset A. In the case where g=1, basis in A is zero. The only way to get a basis adjustment is to sell the asset. In this case, expression (10) is the same as expression (8). Otherwise, r is higher in the retrospective case than in the prospective case--as g goes to zero, $\pi\tau g$ also does. This is the same qualitative result as in the comparison of a retrospective and prospective capital gains exclusion.

3. Fully Retrospective Indexing

A third option would index the basis of all capital gains assets for past as well as future inflation. Fully retrospective indexing affects terminal wealth whether or not the portfolio asset is held because the portfolio asset is fully indexed for inflation. This is an exact analogue to the treatment of assets under a retrospective exclusion. However, as will be shown below, the incentive to sell is more uniform under fully retrospective indexing than under a similar retrospective exclusion.

If the portfolio asset is held, terminal wealth would be

$$W_h = (1+r_0)(1-\tau) + \tau b(1+\pi_0)(1+\pi_1) ,$$

which is the same as terminal wealth under present law except for the adjustment to the basis (b) for past (π_0) and future (π_1) inflation.

If asset B is purchased instead, terminal wealth would be

$$W_s = [1-\tau+b(1+\pi_0)\tau]\times[(1+r)(1-\tau)+(1+\pi_1)\tau] .$$

Solving for the break-even r (the threshold return) yields the following expression:

$$r = -\frac{1+\pi_1\tau}{1-\tau} + \frac{(1+r_0)(1-\tau)+\tau b(1+\pi_0)(1+\pi_1)}{(1-\tau)[1-\tau+b(1+\pi_0)\tau]} .$$

It may be shown that the threshold return would always be lower than under present law as long as π_0 is positive or π_1 and g are positive.

For example, suppose that a 30 percent exclusion was equivalent to past (π_0) and future (π_1) inflation. In that case, fully retrospective indexing would produce a lower threshold return for most levels of accrued gain. The exception is that, with a very large accrued gain, the exclusion provides more of an incentive to sell. This case is illustrated in Figure 10.

To see more clearly what affects the decision to sell, look at the difference in terminal wealth if the asset is sold as compared with holding. This difference, defined as $\Delta = W_s - W_h$, may be shown to equal the following expression:

$$\Delta = g\pi_1\tau(1-\tau) + (1-g)\pi_0\tau[r(1-\tau)+\pi_1\tau] .$$

B. Temporary Exclusions

1. Temporary Exclusion Followed by Retrospective Indexing

Another alternative would exclude long-term capital gains realized during a temporary period, followed by retrospective indexing. The basis would be indexed for inflation starting either from the proposal's effective date or an asset's purchase date, whichever is later.

Assuming that both A or B would be held through the temporary period, the exclusion would only affect the current sale of A. Let the preferential rate on the current sale be τ' and let the tax rate on capital gains on subsequent sales be the same as the rate on ordinary income, τ. For example, some options call for a 30 percent exclusion, so $\tau'=.7\tau$.

If asset A is held, the exclusion is irrelevant and terminal wealth is the same as under retrospective indexing. Terminal wealth, W_h, is determined by equation (9). If asset B is purchased, the gain on A is taxed at rate τ' and the subsequent gain on B is taxed at rate τ after adjusting the basis for inflation. Thus, W_s is as follows:

$$W_s = b + g(1 - \tau') + [r(1 - \tau) + \pi\tau](1 - \tau'g). \tag{11}$$

Equating W_s to W_h and solving for r yields the following expression:

$$r = r_0 \frac{1}{1 - \tau'g} - \frac{\pi\tau g(1 - \tau') + g(\tau - \tau')}{(1 - \tau'g)(1 - \tau)}. \tag{12}$$

This expression reduces to equation (10) when $\tau=\tau'$. Otherwise, r is lower under the temporary exclusion than under retrospective indexing alone as long as $g>0$. In other words, reducing the lock-in effect on asset A creates an additional inducement to sell.

The relationship between (12) and (8), the break-even return under prospective indexing, depends on g. When g is small, prospective indexing provides the greater incentive to sell because the only way to get indexing is to purchase a new asset. At low levels of g, lock-in is unimportant so the benefits of the current exclusion are minor. On the other hand, if g is large, lock-in is important and the

value of indexing the basis of A is small relative to full indexation of B. In this case, the temporary exclusion provides the greater inducement to sell.

2. Temporary exclusion followed by prospective indexing

Another option is a temporary exclusion followed by prospective indexing purchased after the temporary exclusion expires. Some peculiar incentives are created by this discontinuity between the exclusion period and the enactment of indexing. Most important, taxpayers would have a great incentive to sell most of their relatively liquid assets at the end of the exclusion period and purchase new ones when they qualify for indexing. Much of this churning can be avoided by allowing taxpayers to mark-to-market assets to qualify for indexing.

Looking at an asset, A, held at the end of the temporary period, terminal wealth would be the same as under present law if the asset were held. If the asset were sold, however, the taxpayer gets an exclusion on accumulated gains. Thus W_s is the same as under the temporary exclusion with retrospective indexing, as in Equation (11). Equating W_s and W_h and solving for r yields the following expression:

$$r = \frac{1}{1 - \tau}\left[\frac{g(\tau' - \tau) + r_0(1 - \tau)}{1 - \tau' g} - \pi\tau\right]. \tag{13}$$

It can be shown that r is lower under this plan than under any of the other indexing schemes except when the basis is zero, in which case it is equivalent to a temporary exclusion with retrospective indexing.

IV. How Big an Incentive Is It?

The results derived above tell a qualitative story about which kinds of capital gains tax cuts are likely to induce more selling of particular kinds of assets and why. This section pursues several ways of putting capital gains tax cuts in perspective.

A. The Incentive to Mark to Market

Under a prospective tax cut, taxpayers will have an incentive to mark to market certain assets. The stronger the incentive to mark to market, the larger are short-term revenues likely to be. As an example, the temporary exclusion followed by prospective indexing provides an incentive to mark to market almost all portfolio assets that would not have been held until death.

Taxpayers will mark assets to market if they can increase after-tax wealth by doing so. This will occur if r_0 is greater than r, the threshold return. In other words, taxpayers would have an incentive to sell the portfolio asset and buy it back again, which is essentially what marking to market is. From Equation (8), the maximum portfolio return at which a taxpayer would mark to market is found by setting r_0 equal to r. The result is

$$r_0 = \frac{\pi(1 - \tau g)}{(1 - \tau)g}.$$

This expression is a declining function of g, which means that the incentive to mark to market is lower for assets with large accrued gains. At the limit where g = 1, the taxpayer would only mark to market if r_0 were less than π--that is, if the real return were expected to be negative. However, in this case, it would almost certainly be true that some alternative asset would pay a higher rate of return so the taxpayer would, instead, sell the portfolio asset.

Under a temporary exclusion with prospective indexing, the incentive to mark to market is much greater. From Equation (13), setting $r=r_0$, the maximum return would be

$$r_0 = \frac{g(\tau - \tau') + \pi\tau(1 - \tau' g)}{(1 - \epsilon)\tau' g}.$$

This is also a decreasing function of g, but even in the extreme case where g=1, the maximum r_0 is 139 percent assuming π=50 percent, τ=28 percent, and τ'=19.6 percent. Of course, the higher expected inflation is, the more incentive there is to mark to market. However, even if expected inflation were zero, so indexing was worth nothing, there would be an incentive to mark-to-market if r_0 were less that 59.5 percent to take advantage of the temporary exclusion.

This computation shows that a temporary exclusion with a mark-to-market option would provide a very strong incentive for taxpayers to realize capital gains. The next section shows that this incentive is probably unprecedented in the history of U.S. tax law.

B. The TRA Sell-Off Compared With a Temporary Exclusion

The largest one-year increase in taxable capital gains in recent memory occurred after the passage of the Tax Reform Act of 1986. Individuals accelerated realizations of accumulated capital gains in 1986 before the repeal of the preferential rate on capital gains, which became effective in 1987. The incentive to sell assets in 1986 can be represented in the same way as the other tax reductions described above. If the taxpayer held a portfolio asset, A, the eventual gain would be taxed at the post-TRA statutory rate of τ. However, if the taxpayer sold, the tax rate on accumulated gains, g, would be at the preferential pre-TRA rate, τ'. The tax rate on the future gain on B would be at the post-TRA rate of τ.

In terms of equations (1) and (2), $\tau_h = \tau_s = \tau$ and $\tau_0 = \tau'$. Thus, terminal wealth if the taxpayer held is as follows:

$$W_h = b + g(1 - \tau) + r_0(1 - \tau) .$$

If the asset is sold, terminal wealth is the following:

$$W_s = b + g(1 - \tau') + r(1 - \tau)(1 - \tau' g).$$

Solving for the threshold return by equating W_s to W_h yields the following:

$$r = \frac{1}{1 - \tau} \times \frac{g(\tau' - \tau) + r_0(1 - \tau)}{1 - \tau' g} .$$

This is identical to the threshold return under a temporary exclusion with prospective indexing except for the inflation term ($-\pi\tau$), which was missing under TRA. In other words, the temporary exclusion provides exactly the same incentive to sell assets as under the TRA sell-off *plus* the inducement of indexation of future gains on newly purchased assets after 1991.

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